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GENERAL

INTRODUCTION

SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of this publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions. These are issued as required.

ORDERING REPLACEMENT PARTS

When ordering replacement parts or equipment information, the full part identification number should be included. This applies to all parts : components, kits, and chassis. If the part number is not known, include the chassis or kit number of which it is a part, and a sufficient description of the required component for proper identification.

PERSONNEL SAFETY

The following precautions are recommended for personnel safety :

- DO NOT transmit if someone is within two feet (0.6 meter) of the antenna.
- DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- All equipment should be properly grounded before power-up for safe operation.
- This equipment should be serviced by a qualified technicians only.

PRE-INSTALLATION CONSIDERATIONS

1. UNPACKING

Unpack the radio from its shipping container and check for accessory items. If any item is missing, please contact KENWOOD immediately.

2. LICENSING REQUIREMENTS

Federal regulations require a station license for each radio installation (mobile or base) be obtained by the equipment owner. The licensee is responsible for ensuring transmitter power, frequency, and deviation are within the limits permitted by the station license.

Transmitter adjustments may be performed only by a licensed technician holding an FCC first, second or general class commercial radiotelephone operator's license. There is no license required to install or operate the radio.

3. PRE-INSTALLATION CHECKOUT

3-1. Introduction

Each radio is adjusted and tested before shipment. However, it is recommended that receiver and transmitter operation be checked for proper operation before installation.

3-2. Testing

The radio should be tested complete with all cabling and accessories as they will be connected in the final installation. Transmitter frequency, deviation, and power output should be checked, as should receiver sensitivity, squelch operation, and audio output. QT equipment operation should be verified.

4. PLANNING THE INSTALLATION

4-1. General

Inspect the vehicle and determine how and where the radio antenna and accessories will be mounted.

Plan cable runs for protection against pinching or crushing wiring, and radio installation to prevent overheating.

4-2. Antenna

The favored location for an antenna is in the center of a large, flat conductive area, usually at the roof center. The trunk lid is preferred, bond the trunk lid and vehicle chassis using ground straps to ensure the lid is at chassis ground.

4-3. Radio

The universal mount bracket allows the radio to be mounted in a variety of ways. Be sure the mounting surface is adequate to support the radio's weight. Allow sufficient space around the radio for air cooling. Position the radio close enough to the vehicle operator to permit easy access to the controls when driving.

4-4. DC Power and wiring

1. This radio may be installed in negative ground electrical systems only. Reverse polarity will cause the cable fuse to blow. Check the vehicle ground polarity before installation to prevent wasted time and effort.
2. Connect the positive power lead directly to the vehicle battery positive terminal. Connecting the Positive lead to any other positive voltage source in the vehicle is not recommended.

CAUTION

If DC power is to be controlled by the vehicle ignition switch, a switching relay should be used to switch the positive power lead. The vehicle ignition switch then controls DC to the relay coil.

3. Connect the ground lead directly to the battery negative terminal.
4. The cable provided with the radio is sufficient to handle the maximum radio current demand. If the cable must be extended, be sure the additional wire is sufficient for the current to be carried and length of the added lead.

5. INSTALLATION PLANNING – CONTROL STATIONS

5-1. Antenna system

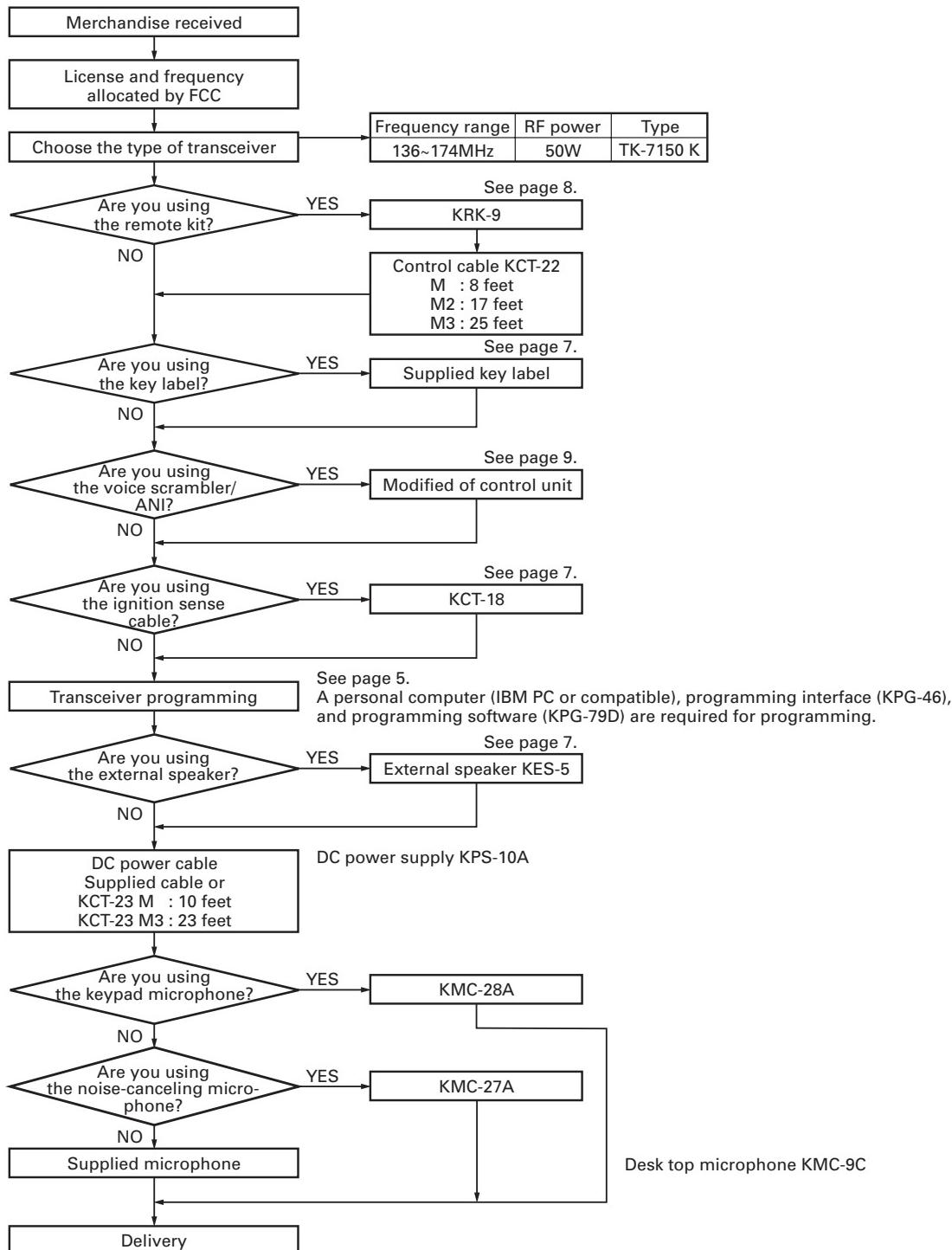
Control station. The antenna system selection depends on many factors and is beyond the scope of this manual. Your KENWOOD dealer can help you select an antenna system that will best serve your particular needs.

GENERAL / SYSTEM SET-UP

5-2. Radio location

Select a convenient location for your control station radio which is as close as practical to the antenna cable entry point. Secondly, use your system's power supply (which supplies the voltage and current required for your system). Make sure sufficient air can flow around the radio and power supply to allow adequate cooling.

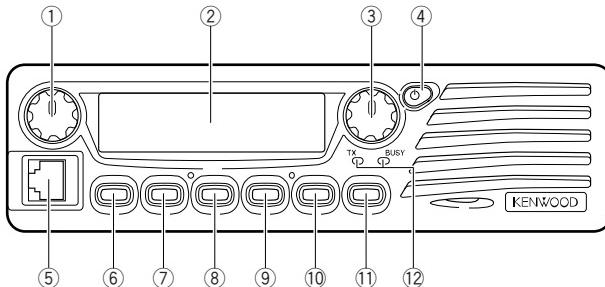
SYSTEM SET-UP



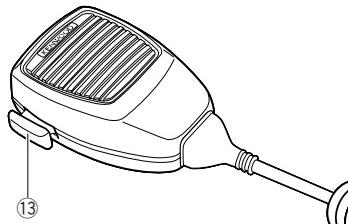
OPERATING FEATURES

1. Controls and Functions

1-1. Front Panel



1-2. Microphone



① Volume Control

Rotate to adjust the volume level. Clockwise increases the volume and counterclockwise decreases the volume.

② Display

(See right.)

③ Selector

Rotate to select a Zone or CH/GID (channel/group ID). Clockwise increases the Zone / CH/GID and counterclockwise decreases the Zone / CH/GID. The default setting is CH/GID Up/Down.

④ ⚡ (Power) switch

Press to switch the transceiver ON. Press and hold for approximately 1 second to switch the transceiver OFF.

⑤ Microphone Jack

Insert the microphone plug into this jack.

⑥ PF1 Key

Press this key to activate its programmable auxiliary function. The default setting is Zone Up.

⑦ PF2 Key

Press this key to activate its programmable auxiliary function. The default setting is Zone Down.

⑧ PF3 Key

Press this key to activate its programmable auxiliary function. The default setting is None.

⑨ PF4 Key

Press this key to activate its programmable auxiliary function. The default setting is None.

⑩ PF5 Key

Press this key to activate its programmable auxiliary function. The default setting is None.

⑪ PF6 Key

Press this key to activate its programmable auxiliary function. The default setting is None.

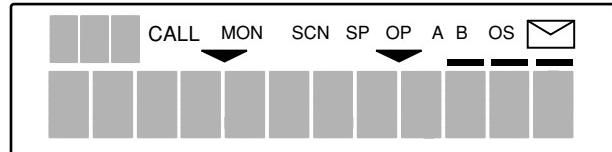
⑫ TX / BUSY LEDs

The TX LED lights red while transmitting. In Conventional Groups, the BUSY LED lights green while receiving.

⑬ PTT switch

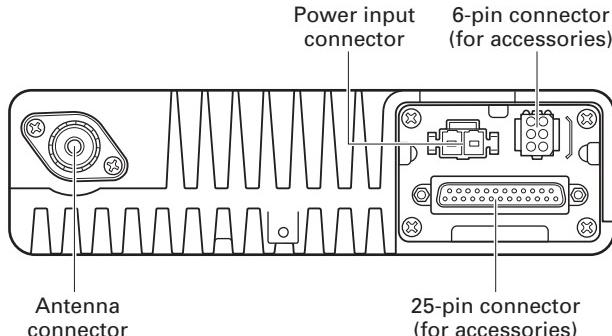
To transmit, press and hold this switch, then speak into the microphone. Release to receive.

1-3. Display



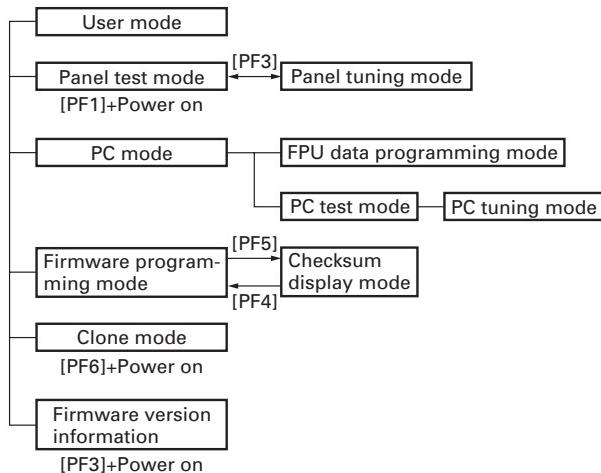
Indicator	Description
☰	Displays the zone, group ID, and channel numbers. Also displays various functions which have been programmed by your dealer.
CALL	Appears when the squelch opens during a 2-Tone or DTMF call.
MON	Appears when the key programmed as Monitor is pressed.
▼ (left side)	Appears when the selected Zone is added to the scan list.
SCN	Appears when you are using Scan mode.
SP	Appears when you are using an external speaker.
OP	Appears when the optional scrambler board is installed and activated.
▼ (right side)	Appears when the selected Channel/Group ID is added to the scan list.
A	Appears when the auxiliary A function is activated.
B	Appears when the auxiliary B function is activated.
OS	Appears when Operator Selectable Tone is activated.
✉	Appears when a FleetSync message is stored in the transceiver memory. Appears and blinks when a new message is received.
☰	Displays the zone, group ID, and channel numbers. Your dealer can program the zone, group ID, and channel names with up to 12 characters, in place of numbers.

1-4. Rear Panel



REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the radio.
PC mode	Used for communication between the radio and PC (IBM compatible).
FPU data programming mode	Used to read and write frequency data and other features to and from the radio.
PC test mode	Used to check the radio using the PC. This feature is included in the FPU. See panel tuning.
Firmware programming mode	Used when changing the main program of the flash memory.
Clone mode	Used to transfer programming data from one radio to another.
Firmware version information	Used to confirm the internal firmware version.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[PF1]+Power ON
Panel tuning mode	[Panel test mode]+[PF3]
PC mode	Received commands from PC
Firmware programming mode	[PF2]+Power ON
Checksum display mode	[Firmware programming mode]+[PF5]
Clone mode	[PF6]+Power ON
Firmware version information	[PF3]+Power ON (one second)

3. Panel Test Mode

Setting method refer to "ADJUSTMENT".

4. Panel Tuning Mode

Setting method refer to "ADJUSTMENT".

5. PC Mode

5-1. Preface

The transceiver is programmed by using a personal computer, programming interface (KPG-46) and programming software (KPG-79D).

The programming software can be used with an IBM PC or compatible. Figure 1 shows the setup of an IBM PC for programming.

5-2. Connection Procedure

1. Connect the transceiver to the personal computer with the interface cable.
2. When the Power switch on, user mode can be entered immediately. When PC sends command the radio enter PC mode, and "PROGRAM" is displayed on the LCD. When data transmitting from transceiver, the red LED is blinking. When data receiving to transceiver, the green LED is blinking.

5-3. KPG-46 Description

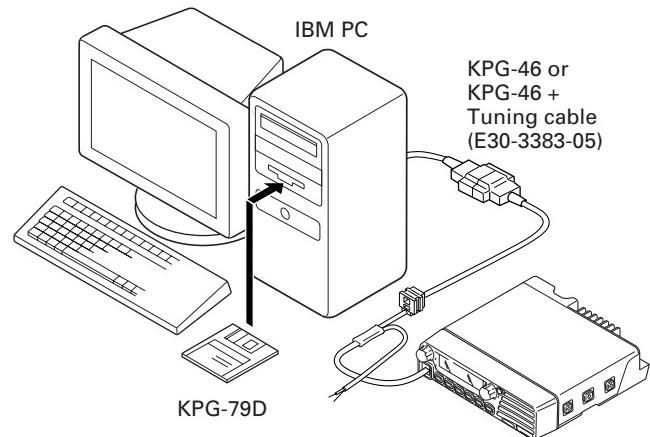
(PC programming interface cable : Option)

The KPG-46 is required to interface the transceiver to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-46 connects the modular microphone jack of the transceiver to the computers RS-232C serial port.

5-4. Programming Software Description

The KPG-79D programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program the transceiver radio via programming interface cable (KPG-46).



TK-7150

Fig. 1

REALIGNMENT

5-5. Programming With IBM PC

If data is transferred to the transceiver from an IBM PC with the KPG-79D, the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

The values should be modified only if necessary.

Data can be programmed into the flash memory in RS-232C format via the modular microphone jack.

KPG-79D instruction manual parts No. : B62-1588-XX.

6. Firmware Programming Mode**6-1. Preface**

The TK-7150 uses flash memory to allow it to be easily upgraded when new features are released in the future.

6-2. Connection Procedure

Connect the TK-7150 to the personal computer (IBM PC or compatible) with the interface cable (KPG-46). (Connection is the same as in the PC mode.)

Note :

You can only program firmware from the 8-pin microphone connector on the front panel. Using the 25-pin logic interface on the rear panel will not work.

6-3. Programming

1. Start up the programming software (Fpro. exe).
2. Set the communications speed (normally, 57600 bps) and communications port in the configuration item.
3. Set the firmware to be updated by file name item.
4. Turn ON the transceiver while pressing and holding the [PF2] key. The transceiver enters Firmware programming mode and "PROG 57600". If Firmware programming mode is inhibited by the FPU, the transceiver enters User mode instead.
If the transceiver receives the firmware data from a PC, "PG" appears on the display.
5. Check the connection between the TK-7150 and the personal computer, and make sure that the TK-7150 is in the program mode.
6. Press write button in the window. A window opens on the display to indicate progress of writing.
7. If writing ends successfully, the TX LED on the TK-7150 lights.
8. If you want to continue programming other TK-7150, repeat steps 3 to 6.

Note :

This mode cannot be entered if the firmware programming mode is set to disable in the programming software (KPG-79D).

6-4. Function

Each time you press the [PF4] key, the data transfer rate alters (19200 / 38400 / 57600 bps).

Note :

Normally, write in the high-speed mode (57600 bps).

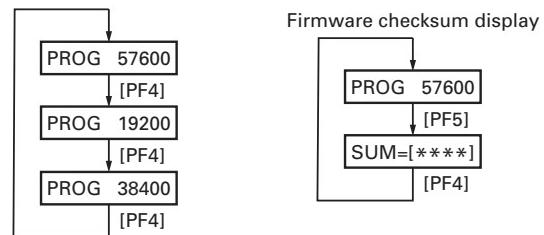


Fig. 2

7. Clone Mode

Programming data can be transferred from one radio to another by connecting them via their modular microphone jacks. The operation is as follows (the transmit radio is the master and the receive radio is a slave).

1. Turn the master TK-7150 power ON with the [PF6] key held down. The TK-7150 displays "CLONE". If Firmware programming mode is inhibited by the FPU, the transceiver enters User mode instead.
2. Power on the slave TK-7150.
3. Connect the cloning cable (No. E30-3382-05) to the modular microphone jacks on the master and slave.
4. Press the [PF6] key on the master while the master displays "CLONE". The data of the master is sent to the slave. While the slave is receiving the data, "PROGRAM" is displayed. When cloning of data is completed, the master displays "END", and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.
5. The other slave can be continuously cloned. When the [PF6] key on the master is pressed while the master displays "END", the master displays "CLONE". Carry out the operation in steps 2 to 4.
6. To end cloning, first you must remove the cloning cable, then switch both master and slave TK-7150s off.

Note :

Only the same models can be cloned together.

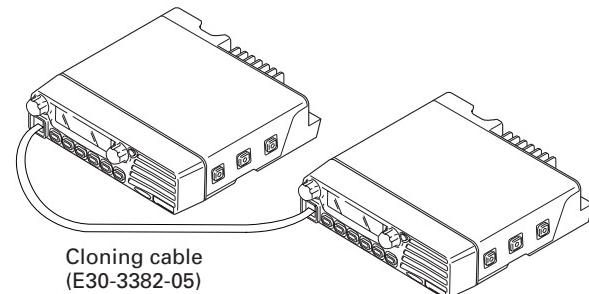


Fig. 3

8. Firmware Version Information

This is a mode to confirm the internal firmware version.

1. Turn the transceiver ON while pressing the [PF3] key. The firmware version will appear on the LCD. When you release the [PF3] key, the transceiver automatically enters User mode.

INSTALLATION

1. Installing Name Plate

Punch out the name plate card. Then insert the plates onto the relative function keys.

You can reconfigure the name plates at any time.

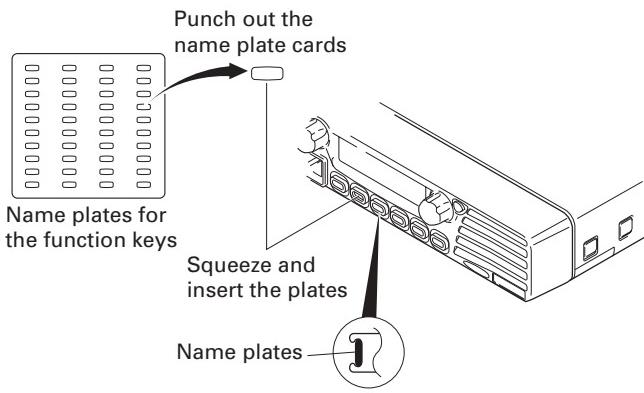


Fig. 1

2. Ignition Sense Cable (KCT-18)

The KCT-18 is an optional cable to use the following functions;

2-1. Ignition Function

The ignition function allows you to turn the transceiver's power on and off with the ignition key of your car. When you are driving with the ignition key on, the horn alert function is disabled.

2-2. Timed Power Off Function

The timed power off function turns the transceiver's power off the time specified with the programming software (KPG-79D) after the ignition key is turned off. When you are driving with the ignition key on, the horn alert function is disabled.

The ignition sense function and the timed power off function can be used at the same time.

2-3. Modification

1. Remove the short plug from the accessory connector (6 pins) on the rear of the transceiver.
2. Cut off the end of the protective cover (accessory), insert the KCT-18 into the protective cover, and insert it into pin 1 (IGN) of the short plug.
3. Install the short plug and protective cover on the connector on the rear of the transceiver, then clamp the bottom of the protective cover with the supplied tie wrap.

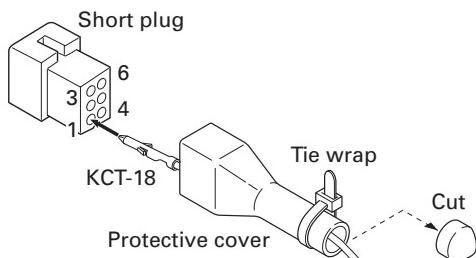


Fig. 2

3. External Speaker (KES-5)

The external speaker output from the accessory connector (6 pin) on the rear of the transceiver is 13W/4Ω. Use the KES-5.

3-1. Connection for the KES-5 with the TK-7150

■ When taking the AF output from the accessory connector (6-pin) on the rear of the radio

The following tools are required for changing the connector.

• Extracting tool

The following extracting tool is recommended;
Molex inc. Order No. : J5800-002 (W05-0878-00)

1. Remove the connector with jumper from the external speaker connector on the rear panel of the radio (Fig. 3-1).
2. Remove the terminals with the jumper from the connector housing holes number 5 and 6 using the extracting tool.

Removing the jumper lead (Fig. 3-2)

- 1) Insert the extracting tool (J5800-002) into the connector while pushing the jumper lead in the direction of (a).
- 2) Push the extracting tool into collapse the barbs of the crimp terminal.
- 3) Pull out the lead while continuing to push the extracting tool in the direction (b).
3. Cut off the end of the protection cover, insert the KES-5 speaker cable into the protective cover.
4. Reinsert the terminal with the black and white stripe lead into hole number 5, and the terminal with the black lead into hole number 4 (Fig. 3-3).
5. Install the plug and protective cover on the accessory connector on the rear of the transceiver, then clamp the bottom of the protective cover with the supplied tie wrap.

Square-type plug
(E37-1031-05)

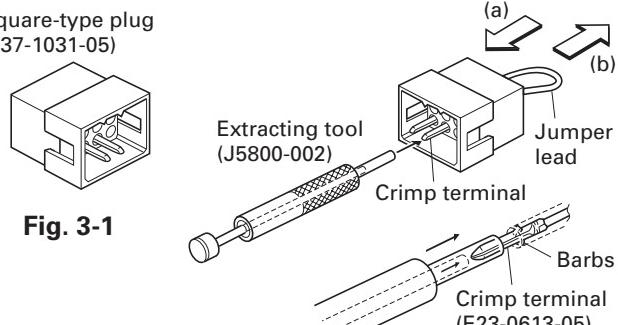


Fig. 3-1

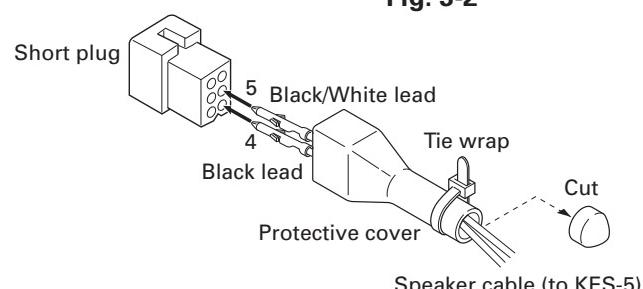


Fig. 3-3

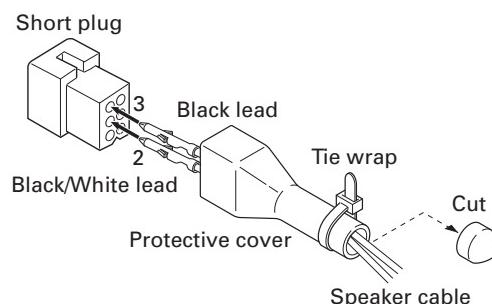
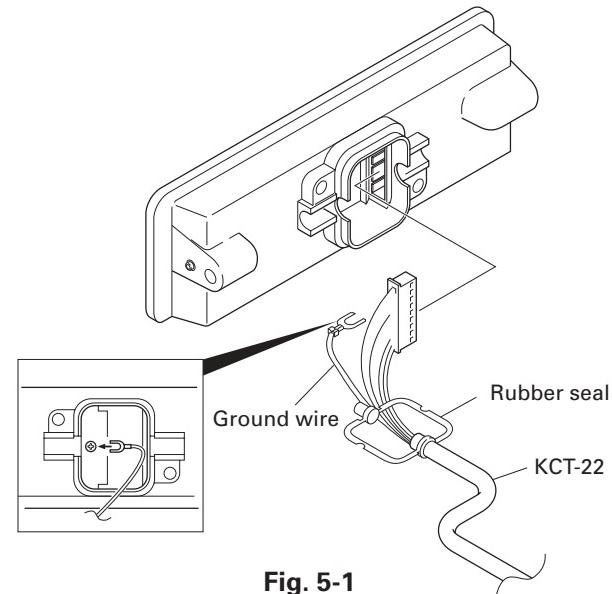
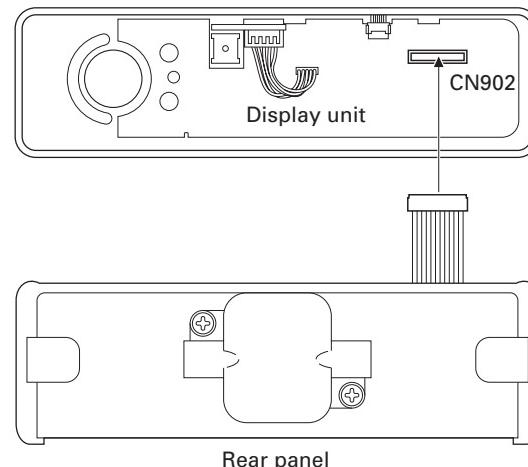
INSTALLATION

4. Use as Public Address Speaker

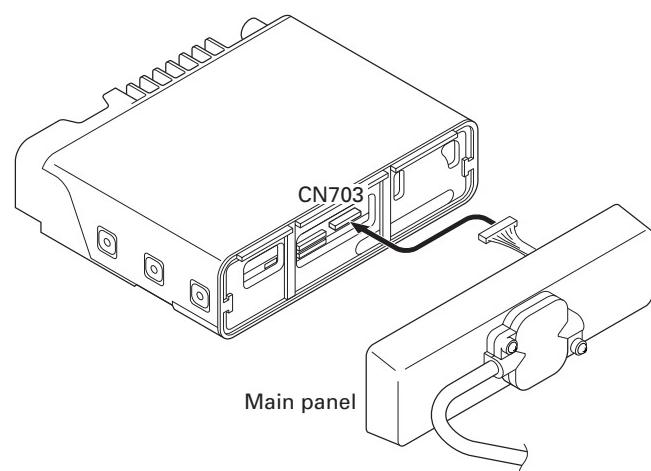
1. Remove the short plug from the 6-pin accessory connector on the rear of the radio. (Remove the jumpers as described in Section 3-1.)
2. Cut off the end of the protective cover, insert the speaker cable into the protective cover, and insert it into pins 2 and 3.
3. Install the plug and protective cover on the accessory connector on the rear of the transceiver, then clamp the bottom of the protective cover with the supplied tie wrap.
4. If you remove jumper shorting pins 5 and 6, the 20W PA (public address) voice signal is output from pins 2 and 3. (Only when the PA or SP switch is on.)
5. If you use the radio with pins 5 and 6 shorted, the internal speaker is available.

Notes :

- Relation ship between accessory connector (6-pins) connection and speaker output.
- When pins 5 and 6 are shorted; The internal speaker is used.
- When pins 5 and 6 are open and output is from pins 2 and 3; The 20W external speaker is used.

**Fig. 4****Fig. 5-1****Fig. 5-2****5. Single Control Head Remote Kit (KRK-9) and Control Cable (KCT-22)**

1. Lift the tab on the bottom of the transceiver, then pull the panel away from the transceiver.
2. Remove the connector that binds the display unit to the TX-RX unit.
3. As shown in Figure 5-1, make sure that the rubber seal is placed above the cable, then plug the 11-pin connector into the front panel PCB assembly.
4. Also, affix the ground wire to the front panel chassis, as shown in Figure 5-1, with the supplied screw.
5. Choose the remote wire position (right side or left side), then place the seal within the guide rail. Attach and secure the cover using the 2 binding screws.
6. Plug the 12-pin connector (from the rear panel) to the CN902 socket on the display PCB, as shown in Figure 5-2.
7. Push and secure the panel into the chassis so that the 6 tabs on the top and bottom are securely fixed.
8. Plug the connector from the main panel into the CN703 socket (Figure 5-3).
9. Push and secure the main panel so that the 6 tabs on the top and bottom of the panel are securely fixed.

**Fig. 5-3**

INSTALLATION

6. Optional Board

6-1. Voice Scrambler Board Connection

■ Modification

1. Remove the cabinet and shielding cover from the transceiver.
2. Remove the panel.
3. Delete R798 and R866 on the TX-RX unit.

■ Connection

The functions of pins of CN701 on the foil side of the TX-RX unit are shown in the figure.

Join the CN701 connector to the voice scrambler board via the E37-0808-05 connector cable.

Note : You must setup the FPU.

The Voice Scrambler Board is connected subsequent to the de-emphasis circuit.

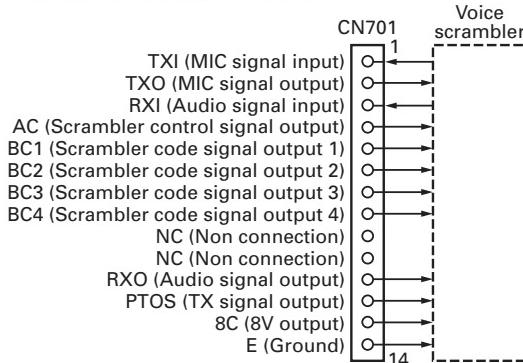


Fig. 6-1 Foil side of the TX-RX unit

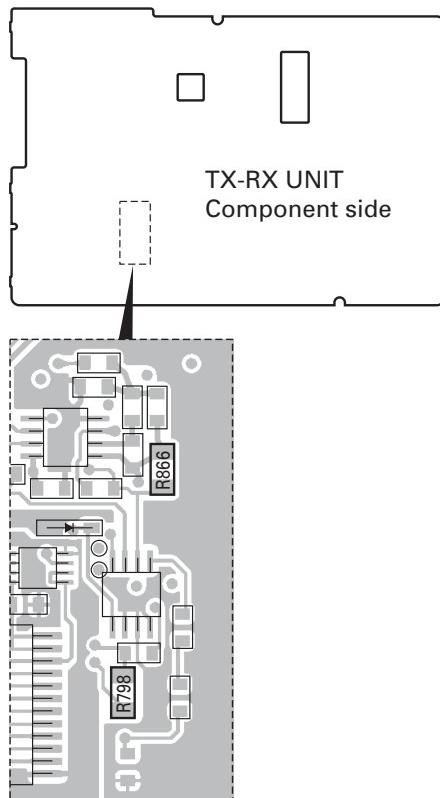


Fig. 6-2

6-2. ANI Board Connection

■ Modification

1. Remove the cabinet and shielding cover from the transceiver.
2. Remove the panel.

■ Connection

Join the CN700 connector to the ANI board via the E37-0808-05 connector cable.

When the ANI board QE-2 is used, you must also use the E37-1075-05 connector.

Note : You must setup the FPU.

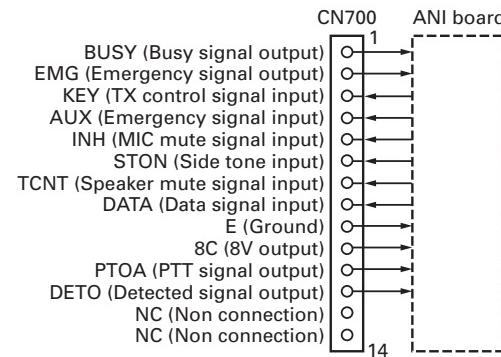
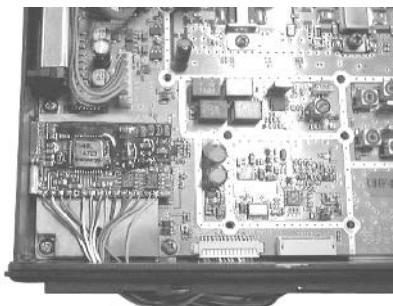


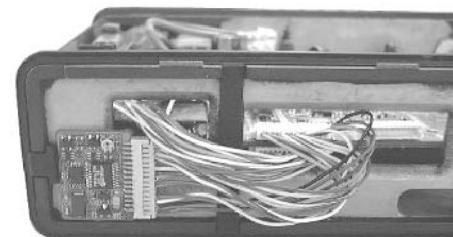
Fig. 6-3 Component side of the TX-RX unit

6-3. Example for Wire Connection

■ Picture (Scrambler board and ANI board)



Top view



Front view

INSTALLATION

7. Wiring of the Cable for Installing the Built-in Type GPS Unit or Other PC Board

1. Loosen the 2 screws (①) to remove the D-sub 25-pin connector.
2. Looses the 4 screws (②) to remove the Hardware fixture.
3. Remove the CN704 connector with the 6-pin lead wire.
4. Take out the Hardware fixture.
5. Cut the packing as shown in the illustration.
7. Tighten the 4 screws to attach the Hardware fixture.
8. Tighten the 2 screws to fix attach D-sub 25-pin connector.

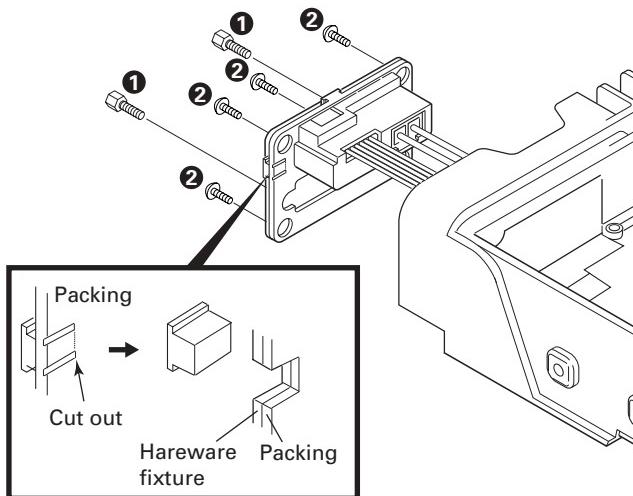


Fig. 7-1

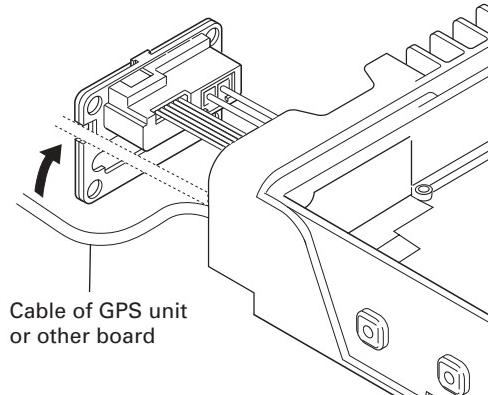


Fig. 7-2

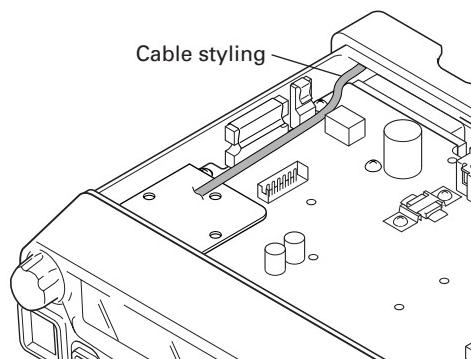


Fig. 7-3

8. Horn Alert Function

The HR1 and HR2 pin of the accessory connector (25-pin) on the rear of the transceiver is a relay and maximum current is 1A.

8-1. Modification

1. Remove the cabinet and shielding cover from the transceiver.
2. Remove the panel.
3. Remove the short plug from the 6-pin accessory connector on the rear of the transceiver.
4. Delete R754 on the TX-RX unit.

	Default	Modification
R754	Enable	Disable
State		

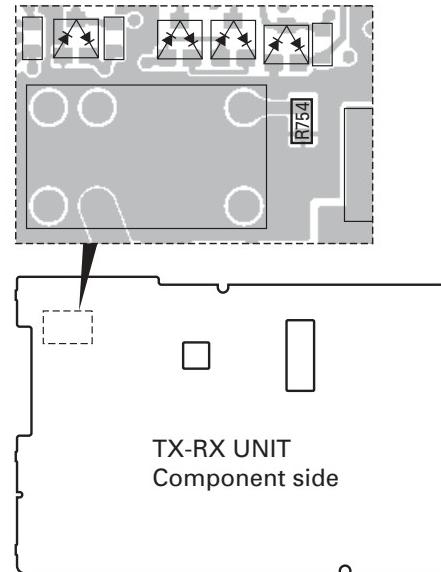


Fig. 8

INSTALLATION

9. Special Instructions for Replacing the Final Amplifier Q5

To replace the Final Amp Q5, ensure to follow the instructions given below:

9-1. C89 and C90 Positions

1. Ensure to solder C89 and C90 to securely contact Q5.

Note : The TX power may vary depending on the position of C89 and C90.

9-2. Soldering

1. Ensure to solder C89 and C90 with the earth spring legs as illustrated in Fig. 9-3.

Note : Use excessive solder to make it thicker than the electrodes of the chip.

2. Solder the terminals until the electrodes of the chip are fully covered. (Refer to Fig. 9-1.)

Note : Use excessive solder to make it thicker than the electrodes of the chip. (Refer to Fig. 9-2.)

3. To solder the source side of C90 (FET Q5 source side), solder the earth springs until they are fully covered. (Refer to Fig. 9-4.)

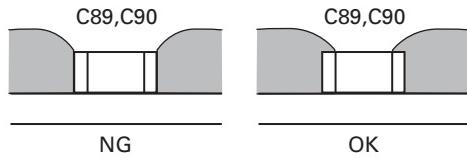


Fig. 9-1

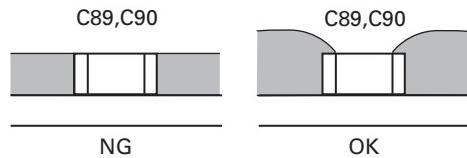


Fig. 9-2

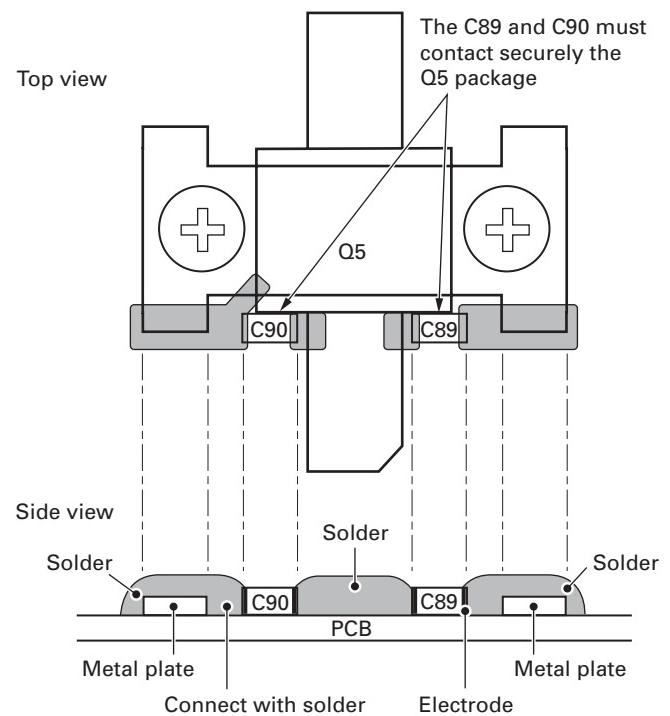


Fig. 9-3

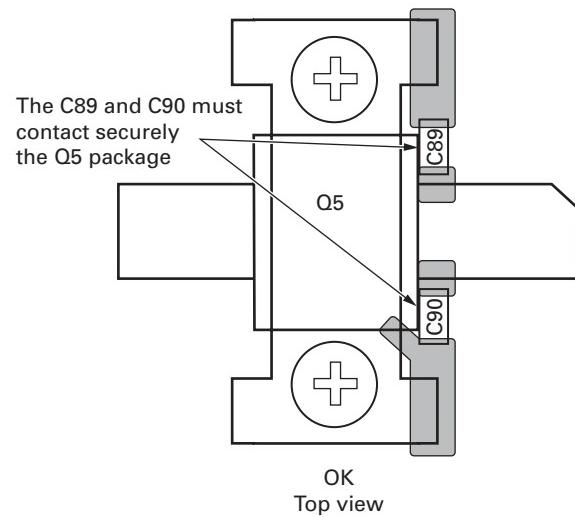


Fig. 9-4

CIRCUIT DESCRIPTION

1. Outline

The TK-7150 is a VHF/FM transceiver designed to operate in the frequency range of 136 to 174MHz. Transmission output power is 50 watts. The maximum channel capacity is 128.

The unit consists of receiver, transmitter, phase-locked loop (PLL) frequency synthesizer, and control circuits.

2. Receiver Circuit

The receiver is double conversion superheterodyne, designed to operate in the frequency range of 136MHz to 174MHz.

The receiver circuit consists of the following : 2-1 front-end circuit, 2-2 first mixer, 2-3 IF amplifier circuit, 2-4 audio amplifier circuit, and 2-5 squelch circuit.

2-1. Front-end Circuit

The front-end circuit consists of former BPF (D209), RF amplifier Q213, and latter BPF (D208 and D207). The BPF covers frequency ranges 136 to 174MHz.

The latter BPF (D208 and D207) attenuates the unwanted signals, and sends only the necessary signal to the first mixer.

2-2. First Mixer

The signal from the BPF is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer DBM (Q209, Q210, Q211 and Q212) to become a 44.85MHz first intermediate frequency (IF) signal. The first IF signal is fed through two monolithic crystal filters (XF201; Wide, XF202; Narrow) to further remove spurious signals.

2-3. IF Amplifier

The first IF signal is amplified by Q207 and Q206, and then enters IC201 (FM system IC). The signal is heterodyned again with a second local oscillator signal (44.395MHz) with in IC201 to become a 455kHz second IF signal. The second IF signal is fed through a 455kHz ceramic filters (CF201 and CF203; Wide, CF202 and CF204; Narrow) to further eliminate unwanted signal, and the quadrature detection circuit FM-detects the signal to produce a base-band signal and output it from pin 9.

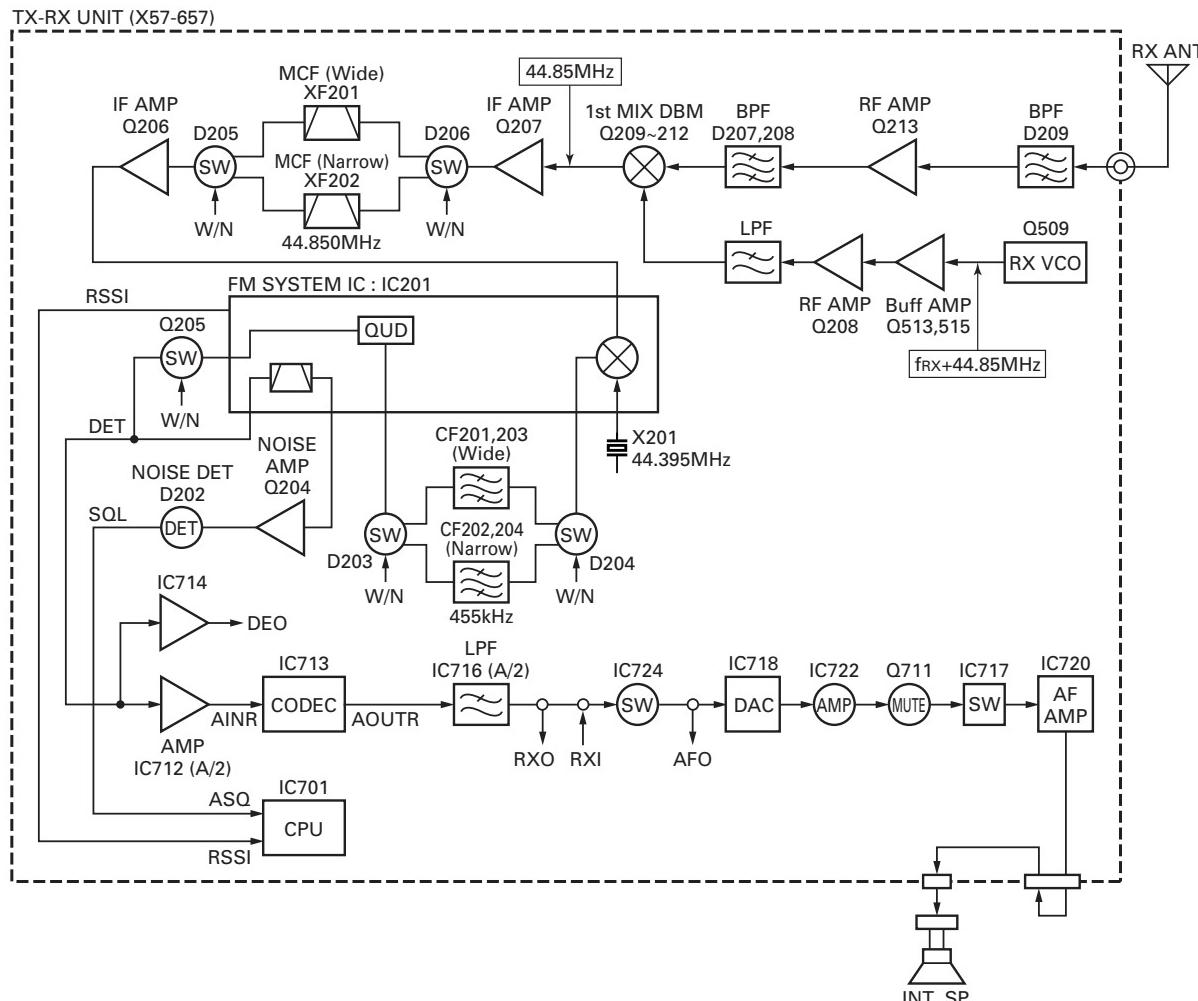


Fig. 1 Receiver circuit

CIRCUIT DESCRIPTION

2-4. Audio Amplifier

The recovered audio signal obtained from IC201 is amplified and anti-aliasing filtered by IC712 (A/2), inputted to the AINR terminal of CODEC IC (IC713), and audio processed by DSP (IC710). The processed audio signal from AOULTR terminal of IC713 is amplified and filtered by IC716 (A/2) to a sufficient level. The audio signal goes to an electronic volume (IC718) and then it passes through the amplifier (IC722), to the input of multiplexer IC (IC717), and is amplified to drive a loudspeaker by an audio power amplifier (IC720). The audio output can be provided to external 4Ω speaker through the 6-pin ACC connector "ES1, ES2" on the rear panel. Q711 is a mute switch.

2-5. Squelch Circuit

The output signal from IC201 enters FM IC again, then passed through a band-pass filter.

The noise component output from IC201 is amplified by Q204 and rectified by D202 to produce a DC Voltage corresponding to the noise level. The DC voltage is sent to the analog port of the CPU (IC701).

IC201 outputs a DC voltage (RSSI) corresponding to the input of the IF amplifier.

3. Transmitter Circuit

The transmitter circuit consists of the following circuits : 3-1 microphone circuit, 3-2 modulation level adjustment circuit, 3-3 driver and final power amplifier circuit, and 3-4 automatic power control circuit.

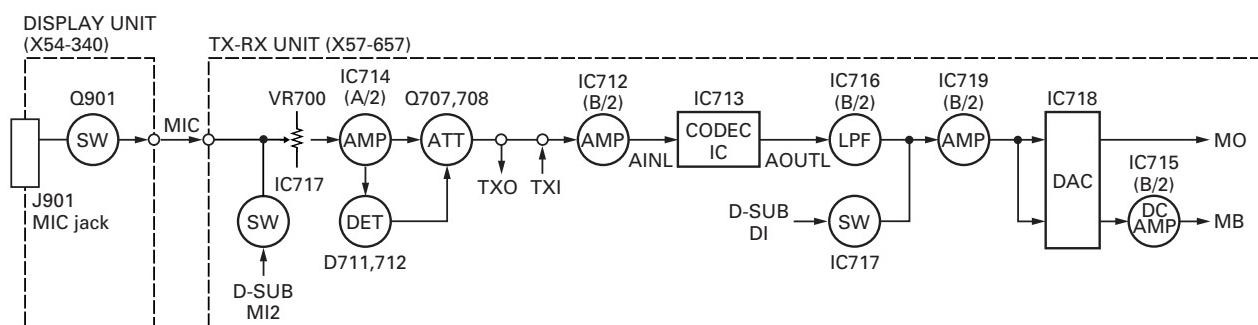


Fig. 2 Microphone circuit

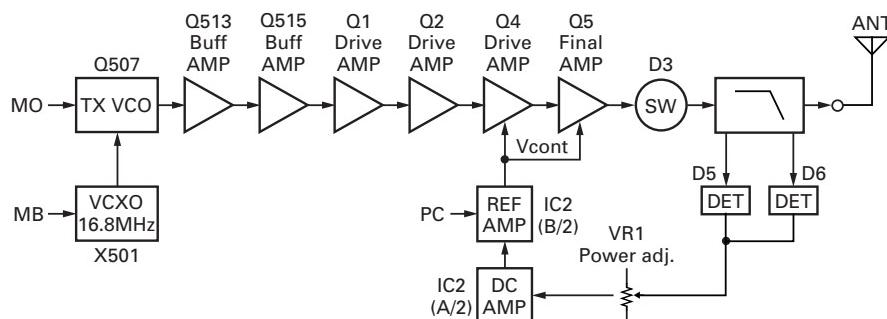


Fig. 3 Drive and final amplifier circuit

3-1. Microphone Circuit

The signal from the microphone passes through the mute switch (Q901) and is then routed to the Display unit (X54-340) and TX-RX unit (X57-657). The signal then passes through the AGC circuit to avoid signal distortion.

This circuit consists of IC714, D711, D712, Q707, and Q708. The AGC is operated by controlling the + and - side levels of amplitude using the current obtained by positive and negative detection of the amplified audio signal.

The audio signal is amplified by IC712 (B/2), input to the AINL terminal of CODEC IC (IC713), and audio processed by DSP (IC710). The processed audio signal from the AOULTR terminal of IC713 is amplified and filtered by IC716 (B/2), and amplified by the summing amplifier IC719 (B/2).

3-2. Modulation Level Adjustment Circuit

The output of the summing amplifier IC719 (B/2) is passed to an electronic volume (IC718) for maximum deviation adjustment before being applied to a varactor diode in the voltage controlled oscillator VCO.

3-3. Driver and Final Power Amplifier Circuit

The transmit signal is generated by the TX VCO (Q507), amplified by Q513 and Q515. This amplified signal is amplified by Q1, Q2, Q4, and Q5. And this signal is passed to the FINAL stage. The RF power amplifier consists of MOS FET transistor.

CIRCUIT DESCRIPTION

3-4. Automatic Power Control, Circuit and Transmitter

The automatic power control (APC) circuit stabilizes the transmitter output power at a predetermined level, and consists of forward/reflected power detector circuits. The forward/reflected power detector circuits detects forward RF power and reflected RF power to DC voltage, and consists of a C coupling type detection circuit, RF detector D5/D6, and DC amplifier IC2 (A/2).

The voltage comparator (IC2 B/2) compares the voltage obtained by the above detected voltage with a reference voltage, set using the microprocessor and IC718 and IC715.

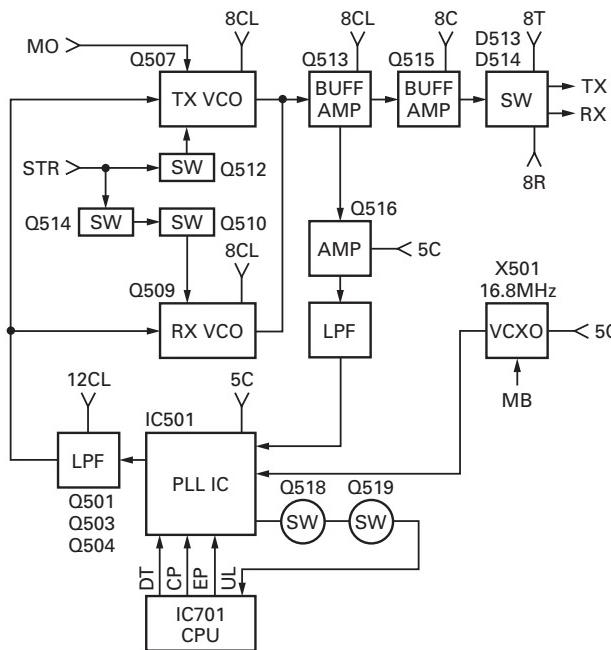
An APC voltage proportional to the difference between the sensed voltage and the reference voltage appears at the output of IC2. This output voltage controls the gate voltage for the drive amplifier Q4 and final amplifier Q5, which keeps the transmitter output power constant.

4. PLL Frequency Synthesizer

The transmit signal and the receive first L.O. signal are generated by the PLL digital frequency synthesizer. The frequency synthesizer consists of a transmitter voltage controlled oscillator (TX VCO; Q507), a receiver voltage controlled oscillator (RX VCO; Q509), a buffer amplifier (Q513 and Q515), an RF amplifier (Q516), a low-pass filter (Q501, Q503 and Q504), a PLL IC (IC501), and TX VCO/RX VCO switches (Q510 and Q512).

In the transmit signal mode, an operating frequency programming data is sent to IC501, from the CPU (IC701), to set the programmable counter within IC501. Q512 is turned on to activate the TX VCO and the output signal of the TX VCO is amplified by Q513 and Q515.

The signal is then divided down in frequency, at the programmable counter in IC501, to 5.0kHz or 6.25kHz, 7.5kHz which is compared in phase with a 5.0kHz or 6.25kHz, 7.5kHz reference signal, derived from 16.8MHz VCXO (X501) and a

**Fig. 4 PLL circuit**

1/3360 or a 1/2688, 1/2240 fixed counter in IC501, at the phase comparator in IC501. The VCXO operates at 16.8MHz and its frequency stability is maintained within 2.5ppm (temperature range of -30 to +60 degrees).

The phase comparator output signal is fed into a low-pass filter (Q501, Q503 and Q504) before being applied to the TX vco as a frequency control voltage. This low-pass filter's power is supplied by the DC/DC converter (Q502, Q505, Q506, Q508, and Q511). If an unlock condition occurs in the phase locked loop, this condition is detected by Q518 and Q519. This causes the transmitter 8V supply cut off, resulting in the prevention of an unauthorized transmission.

The transmitter modulation signals (processed Mic. audio and sub-audible signalling) are applied to the TX VCO for frequency modulation.

In the receive mode, the VCO is substituted with Q509 (RX VCO) and it generates the receiver first local oscillator signal according to the data sent from the CPU (IC701). The basic operation of the synthesizer remains the same.

5. Control Circuit

The control circuit mainly consists of CPU, memory circuit, DSP circuit, and power supply circuit.

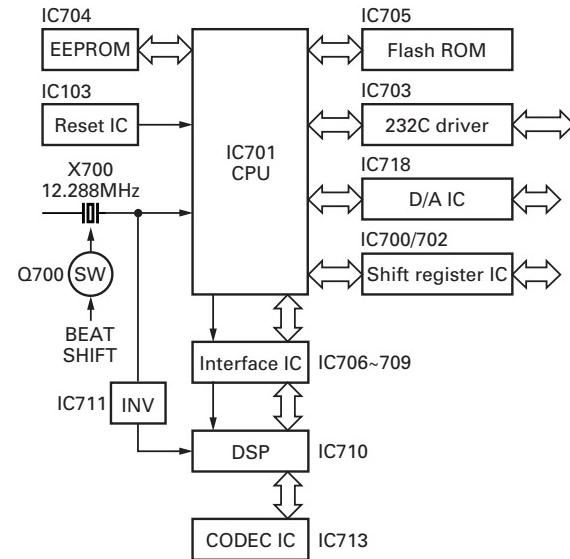
5-1. CPU

The CPU (IC701) controls the flash ROM (IC705), the DSP (IC710), the receiver circuit, the transmitter circuit, the control circuit, and the display circuit and transfers data to or from an external device.

5-2. Memory Circuit

IC705 has a flash ROM with a capacity of 4M bits that contains the control program for the CPU, the signal processing program for DSP and data such as channels and operating features.

This program can be easily written from an external devices. Data such as the operating status are programmed into the EEPROM (IC704).

**Fig. 5 Control circuit**

CIRCUIT DESCRIPTION

5-3. DSP Circuit

The DSP circuit filters transmit/receive audio signal and encode/decode signalling (QT, DQT, MSK, DTMF, 2-Tone, LTR ID). This circuit consists of IC710, IC706, IC707, IC708, IC709 and IC713.

The receive audio signal is converted from analog to digital by IC713 with a sampling frequency of 19.2kHz. The digitized audio signal is sent to DSP (IC710) to process the signalling signal and audio signal. The processed digital audio signal is fed to CODEC (IC713), converted from digital to analog, and the analog signal is output from pin 16 (AOUTR).

The transmit audio signal coming from IC714 (A/2) is amplified by IC712 (B/2), fed to pin 3 (AINL) of CODEC (IC713), and converted from analog to digital at a sampling frequency of 19.2kHz. The digitized transmit audio signal is AGC-processed, pre-emphasized and filtered at 300Hz to 3kHz by DSP (IC710), and the resulting signal is feed back to CODEC (IC713), and converted from digital to analog, and the analog signal is output from pin 15 (AOUTL).

IC706, IC707, IC708 and IC709 are interface IC between the CPU operated at 5.0V and the DSP operated at 3.3V.

5-4. Power Supply Circuit

The voltage is always applied from +B. D103 protects IC102 (DFF) against overvoltage.

Pulses from power switch are input to the IC102 clock line and the CPU (IC701). These clock pulses reverse the output High (radio : turn off) → Low (radio : turn on), do not reverse the output Low → High. The CPU (IC701) output the pulse to IC102 set line to reverse the output Low → High.

IGN is input to the IC102 reset line and the CPU (IC701). When the IC102 reset voltage rises, the output goes Low (ra-

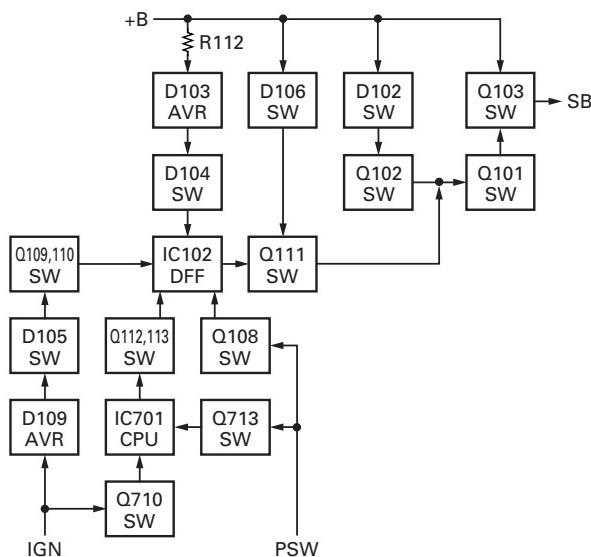


Fig. 6 Power supply circuit

dio : turn on). When IGN falls, the CPU (IC701) output the pulse to IC102 set line to reverse the output Low → High after the programmed time expire (Timed power off function).

If 24V is supplied to the radio by mistake, Q102 turns on, Q101 turns off, the power is forced to be turned off.

This circuit consists of IC104 (8V), IC105 (5V), IC106 (3.3V), IC108 (3.3V) and IC107 (1.8V).

6. Display Circuit

The display unit consists of CPU (IC904), LCD assembly, LED, and other components.

Channels are changed by the rotary switch (S1). The up/down signals from the rotary switch enter the CPU (IC904), and converted to a serial data signal, and are sent to the CPU (IC701) in the TX-RX unit. The on/off signals of keys other than the power switch, and the PTT and HOOK signals, are converted to serial data and sent to the CPU (IC701) in the TX-RX unit.

Data is displayed on the 12 digits and 3 digits dot matrix alphanumeric display.

7. RS-232C Circuit

The RS-232C circuit connects the RS-232C serial port of a personal computer directly to this model to perform FPU operation (Read and Write). The FPU operation can also be performed by connecting a programming cable (KPG-46) to the local microphone on the front panel. The 232C driver IC (IC703) changes the TTL-232C level. The firmware can only be rewritten with the local microphone on the front panel.

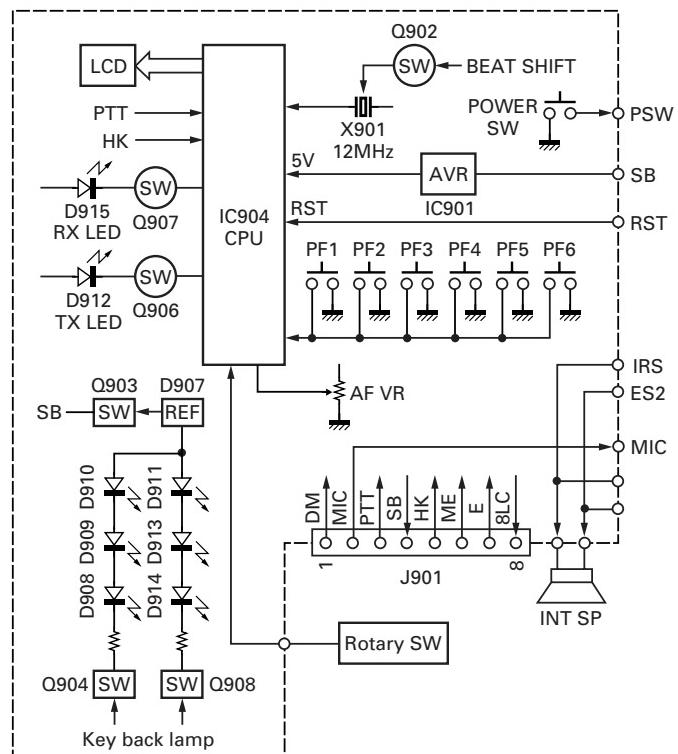


Fig. 7 Display circuit

SEMICONDUCTOR DATA

1. CPU : 30620M8A-5H1GP (TX-RX Unit IC701)

1-1. Pin Function

Pin No.	Name	I/O	Function
1		I/O	Go to port check mode L : Port check mode, H : User mode
2	WN	O	Wide/Narrow H : Narrow, L : Wide
3	8RC	O	8R Control H : 8R on, L : 8R off
4	INTx	O	INT Request to DSP L : INT request
5	STR	O	VCO TX/RX H : TX VCO, L : RX VCO
6	BYTE		+5V
7	CNVss		GND
8	8TC	O	8T Control H : 8T on, L : 8T off
9	SFT	O	Beat Shift H : SFT on, L : SFT off
10	RESET		CPU Reset
11	Xout		12.288MHz
12	Vss		GND
13	Xin		12.288MHz
14	Vcc		+5V
15	NMI	I	Not Used
16	IGN	I	Ignition Sense H : IGN. Sense off, L : IGN. Sense on
17	PSI	I	Power Down Det L : Power down det
18	LD	O	D/A Converter LD
19	CP	O	PLL IC Clock
20	EP	O	PLL IC Enable
21	CONTROL	O	Connect Codec TX Out to speaker line H : Connect, L : Disconnect
22	DT	O	Common Data
23	CK	O	Common Clock
24	SOE	O	Shift Register 1 OE
25	STB1	O	Shift Register 1 Strobe
26	AI4	I	AUX Input No.4 H : Inactive, L : Active
27	RXD2	I	Head Comm (RXD)
28	TXD2	O	Head Comm (TXD)
29	TXD1	O	Acc com2 (TXD)
30	RXD1	I	Acc com2 (RXD)
31	AI3	I	AUX Input No.3 H : Inactive, L : Active
32	AI2	I	AUX Input No.2 H : Inactive, L : Active
33	TXD0	O	Acc com1 (TXD)
34	RXD0	I	Acc com1 (RXD)
35	AI1	I	AUX Input No.1 H : Inactive, L : Active
36		O	Not Used
37	RDY	I	Hardware BUS Wait Control
38	ALE	O	Cannot Use (Address Latch)

Pin No.	Name	I/O	Function
39	HOLD	I	Cannot Use (BUS Hold)
40	HLDA	O	Cannot Use (BUS Hold Status)
41	BCLK	O	Cannot Use (Sys Clock Output)
42	RD	O	Flash ROM : RD, DSP : HDS1
43	BHE	O	Cannot Use (BUS High Enable)
44	WR	O	Flash ROM : WR, DSP : HDS2
45	SBC	O	SB Control H : SBC off, L : SBC on
46	AM	O	Audio Mute H : SP mute, L : SP unmute
47	HCS	O	DSP HCS
48	CS0	O	Flash CS
49~59	A19~A9	O	Cannot Use (Flash ROM Address BUS)
60	Vcc		+5V
61	A8	O	Cannot Use (Flash ROM Address BUS)
62	Vss		GND
63~70	A7~A0	O	Cannot Use (Flash ROM Address BUS)
71	PTO	O	Scrambler TX/RX Control H : RX, L : TX
72	PSW	I	Pow. Switch Det H : Inactive, L : Active
73	Inty	I	INT Request from DSP L : INT request
74	RS	O	DSP Reset H : DSP reset
75	SCL	O	EEPROM Clock
76	SDA	I/O	EEPROM Data
77	KEY	I	TX Request from ANI board L : TX request
78	STB2	O	Shift Register 2 Strobe
79~86	D7~D0		Cannot Use (Flash ROM Data BUS)
87	PDET	I	Power Det Level
88	CDET	I	Power Current Det Level
89	TEMP1	I	Power Temp1 Level
90	TEMP2	I	Power Temp2 Level
91	ASQ	I	Analog Squelch Level
92	RSSI	I	RSSI Level
93	UL	I	Unlock Level
94	Avss		GND
95		I	Not Used
96	Vref		+5V
97	Avcc		+5V
98	AUX	I	Emergency Channel Request from ANI board L : Channel request
99	INH	I	Audio Inhibit from ANI board H : SP unmute, L : SP mute
100	TCNT	I	Tone Control from ANI board L : Board tone output request

SEMICONDUCTOR DATA

2. Shift Register 1 : BU4094BCFV (TX-RX Unit IC702)

2-1. Pin Function

Pin No.	Port Name	Name	I/O	Function
1	STROBE	STB1	I	From CPU STB1 (Pin No.25)
2	SERIAL IN	DATA	I	From CPU Common Data (Pin No.22)
3	CLOCK	CLK	I	From CPU Common Clock (Pin No.23)
4	Q1	MI2	O	External Mic Mute L : Mute, H : Unmute
5	Q2	DI	O	External Data Line Mute L : Mute, H : Unmute
6	Q3	SP	O	Front SP/EXT SP Change L : Front SP, H : External SP
7	Q4	HR	O	Horn Alert L : Relay off, H : Relay on
8	VSS	VSS		GND
9	Qs	Qs	O	No Connect
10	Qs'	Qs'	O	No Connect
11	Q8	AO4	O	AUX Output No.4 H : AUX Out No.4 on, L : AUX Out No.4 off
12	Q7	AO3	O	AUX Output No.3 H : AUX Out No.3 on, L : AUX Out No.3 off
13	Q6	AO2	O	AUX Output No.2 H : AUX Out No.2 on, L : AUX Out No.2 off
14	Q5	AO1	O	AUX Output No.1 H : AUX Out No.1 on, L : AUX Out No.1 off
15	OUTPUT ENABLE	SOE	I	From CPU SOE (Pin No.24) L → Inactive, H → Active
16	VDD	VDD		+5V

3. Shift Register 2 : BU4094BCFV (TX-RX Unit IC700)

3-1. Pin Function

Pin No.	Port Name	Name	I/O	Function
1	STROBE	STB2	I	From CPU STB1 (Pin No.21)
2	SERIAL IN	DATA	I	From CPU Common Data (Pin No.22)
3	CLOCK	CLK	I	From CPU Common Clock (Pin No.23)
4	Q1	BC1	O	Scrambler Code 1 (For SCR) L : SCR Code1 off, H : SCR Code1 on
5	Q2	BC2	O	Scrambler Code 2 (For SCR) L : SCR Code2 off, H : SCR Code2 on
6	Q3	BC3	O	Scrambler Code 3 (For SCR) L : SCR Code3 off, H : SCR Code3 on
7	Q4	BC4	O	Scrambler Code 4 (For SCR) L : SCR Code4 off, H : SCR Code4 on
8	VSS	VSS		GND

Pin No.	Port Name	Name	I/O	Function
9	Qs	Qs	O	No Connect
10	Qs'	Qs'	O	No Connect
11	Q8	AC	O	Scrambler ON/OFF (For SCR) L : Scrambler on, H : Scrambler off
12	Q7	BUSY	O	Channel Busy (For ANI) L : Busy, H : Not Busy
13	Q6	EMG	O	Emergency ON/OFF (For ANI) L : Emergency on, H : Emergency off
14	Q5	PTO	O	PTT Output (For ANI) L : PTT on, H : PTT off
15	OUTPUT ENABLE	SOE		GND
16	VDD	VDD		+5V

4. D/A Converter : M62364FP (TX-RX Unit IC718)

4-1. Pin Function

Pin No.	Name	I/O	Function
1	Vin1	I	AF Volume First IN
2	Vout1	O	AF Volume First OUT
3	Vout2	O	AF Volume Second OUT
4	Vin2	I	AF Volume Second IN (From DAC Pin No.2)
5	VDD		+5V
6	LD	O	From CPU LD(Pin No.18)
7	CK	O	From CPU Common Clock (Pin No.23)
8	DT	O	From CPU Common Data (Pin No.22)
9	Vin3	I	GND
10	Vout3	O	Tune Varicap
11	Vout4	O	Side Tone Out
12	Vin4	I	Side Tone (From Option Board)
13	Vin5	I	
14	Vout5	O	Max Deviation
15	Vout6	O	
16	Vin6	I	DQT Balance
17	Do	O	Open
18	VDRef	I	
19	Reset	I	+5V
20	GND		GND
21	Vin7	I	+5V
22	Vout7	O	Frequency Adjust
23	Vout8	O	Auto Power Control
24	Vin8	I	+5V

SEMICONDUCTOR DATA

5. Display CPU : 30622M4A-443GP (Display Unit IC904)

5-1. Pin Function

Pin No.	Name	I/O	Function
1	DISP	O	LCD Display ON/OFF L : On, H : Off
2~5		O	Not used
6	BYTE		GND
7	CNVss		GND
8		O	Not used
9	SFT	O	Beat Shift L : Shift off, H : Shift on
10	RESET		CPU Reset
11	Xout		12.0MHz
12	Vss		GND
13	Xin		12.0MHz
14	Vcc		+5V
15	NMI	I	Not used
16~19		O	Not used
20	MIC	O	Mic Mute L : Mute, H : Unmute
21,22		O	Not used
23	DM	I/O	Mic Keypad Data
24		O	Not used
25	BLC	O	Mic Keypad Backlight Control L : Off, H : On
26		O	Not used
27	RXD2	I	Body Comm (RXD)
28	TXD2	O	Body Comm (TXD)
29	TXD1	O	PC Comm (TXD)/connect to PTT
30	RXD1	I	Open (RXD)
31		I	Not used
32		O	Not used
33	TXD0	O	Open (TXD)
34	RXD0	I	PC Comm (RXD)/connect to HOOK
35	HOOK	I	HOOK/connect to RXD0
36	PTT	I	PTT/connect to TXD1
37		O	Not used
38	BCK1	O	PF Key Backlight Control L : Off, H : On
39	PF1	I	PF1 Key Input
40	PF2	I	PF2 Key Input

Pin No.	Name	I/O	Function
41	PF3	I	PF3 Key Input
42	PF4	I	PF4 Key Input
43	PF5	I	PF5 Key Input
44	PF6	I	PF6 Key Input
45~49		O	Not used
50	BCK2		PF Key Backlight Control L : Off, H : On
51	TP3	I	Head Check Mode L : Head check mode, H : Not go to head check mode
52~56		O	Not used
57	BUSY	O	BUSY LED L : Off, H : On
58	TX	O	TX LED L : Off, H : On
59		O	Not used
60	Vcc		+5V
61		O	Not used
62	Vss		GND
63~66		O	Not used
67	RSW4	I	Rotary SW4
68	RSW3	I	Rotary SW3
69	RSW2	I	Rotary SW2
70	RSW1	I	Rotary SW1
71~81		O	Not used
82	LEDK	O	LCD Back Light Control L : Off, H : On
83	DO	O	LCD Data Output
84	DI	I	LCD Data Input
85	CL	O	LCD Clock
86	CE	O	LCD CS
87~92		O	Not used
93	VOL	I	Audio Volume Input
94	AVss		GND
95		O	Not used
96	AVref		+5V
97	AVcc		+5V
98~100		O	Not used

SEMICONDUCTOR DATA

6. DSP : 320VC5402PGE (TX-RX Unit IC710)

6-1. Pin Function

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1,2,12,15, 35~38, 71~74,80, 90,110,126, 143,144	NC1~NC18	-	Not used (No connect)	53	BFSX0	I	Frame sync.for transmitter input (LRCK : 19.2kHz)
6,58,69,81, 95,120,124, 135	HDO~HD7	I/O	HPI data bus	54	BFSX1	I	Not used (No connect)
5,7~11,105, 107~109, 131~134, 136~141,	A0~A19	O	Not used (No connect)	55	HRDY	-	Not used (No connect)
13	HAS	I	HPI address strobe (Pull up)	59	BDX0	O	Serial data transmit output
17	HCS	I	HPI chip select	60	BDX1	-	Not used (No connect)
18	HR/W	I	HPI read/write	61	IACK	-	Not used (No connect)
19	READY	I	Data ready (Pull up)	62	HBIL	I	Byte identification (HPI)
20	PS	O	Not used (No connect)	63	NMI	I	Not used (Pull up)
21	DS	O	Not used (No connect)	64	INT0	I	Command interrupt from Host CPU
22	IS	O	Not used (No connect)	65	INT1	I	Not used (Pull up)
23	R/W	O	Not used (No connect)	66	INT2	I	Boot mode select (Pull up)
24	MSTRB	O	Not used (No connect)	67	INT3	I	Not used (Pull up)
25	IOSTRB	O	Not used (No connect)	77	CLKMD1	I	Clock mode select (Pull down)
26	MSC	O	Not used (No connect)	78	CLKMD2	I	Clock mode select (Pull up)
27	XF	O	CODEC control (H : power down, L : active)	79	CLKMD3	I	Clock mode select (Pull down)
28	HOLDA	-	Not used (No connect)	82	TOUT0	-	Not used (No connect)
29	IAQ	-	Not used (No connect)	83	EMU0	I/O	Emulator 0 (to JTAG connector)
30	HOLD	I	Hold (Pull up)	84	EMU1/OFF	I/O	Emulator 1 (to JTAG connector)
31	BIO	I	Serial data synchronize input	85	TDO	O	Test data output (to JTAG connector)
32	MP/MC	I	Not used (Pull down)	86	TDI	I	Test data input (to JTAG connector)
39	HCNTL0	I	HPI control 0	87	TRST	I	Test reset (to JTAG connector)
41	BCLKR0	I	Receive clock output (SCLK : 614.4kHz)	88	TCK	I	Test clock (to JTAG connector)
42	BCLKR1	-	Master clock output (MCLK : 4.9152MHz)	89	TMS	I	Test mode select (to JTAG connector)
43	BFSR0	I	Frame sync. for receiver output (LRCK : 19.2kHz)	92	HPIENA	I	Not used (Pull up)
44	BFSR1	I	Not used (No connect)	94	CLKOUT	O	Not used (No connect)
45	BDR0	I	Serial data receive input	96	X1	-	12.288MHz (System clock)
46	HCNTL1	I	HPI control 1	97	X2/CLKIN	-	12.288MHz (System clock)
47	BDR1	-	Not used (No connect)	98	RS	I	DSP reset input
48	BCLKX0	I	Transmit clock input (SCLK : 614.4kHz)	99~104, 113~119, 121~123	D0~D15	-	Not used (No connect)
49	BCLKX1	O	Not used (No connect)	127	HDS1	I	HPI data strobe1 (Pull up)
51	HINT/TOUT1	O	Interrupt for Host CPU/Boot mode select (Pull up)	129	HDS2	I	HPI data strobe2 (Pull down)
				3,14,34,40, 50,57,70, 76,93,106, 111,128	Vss	-	GND
				4,33,56, 75,112,130	DVDD	-	VDD for I/O pins (+3.3V)
				16,52,68, 91,125,142	CVDD	-	VDD for core CPU (+1.8V)

COMPONENTS DESCRIPTION**1. Display Unit (X54-3400-10)**

Ref. No.	Part Name	Description
IC901	IC	Voltage regulator
IC902	IC	Voltage detector
IC904	IC	CPU
Q901	FET	MIC switch
Q902	FET	DC switch
Q903	Transistor	Current driver
Q904~908	Transistor	DC switch
Q909,910	Transistor	Inverter
Q911	Transistor	DC switch
D902~906	Diode	Surge protector
D907	Zener diode	Voltage reference
D908~911	LED	Key backlight
D912	LED	TX light
D913,914	LED	Key backlight
D915	LED	RX light
D916	Zener diode	Surge protector
D917	Varistor	Current protector
D918	Zener diode	Surge protector

2. TX-RX Unit (X57-6570-10)

Ref. No.	Part Name	Description
IC1	IC	Not used
IC2	IC	DC amplifier
IC101	IC	Voltage detector
IC102	IC	D flip-flop
IC103	IC	Voltage detector
IC104~108	IC	Voltage regulator
IC201	IC	FM IF system
IC202	IC	Multiplexer
IC501	IC	PLL
IC700	IC	Shift register
IC701	IC	CPU
IC702	IC	Shift register
IC703	IC	RS232C transceiver
IC704	IC	EEPROM
IC705	IC	Flash ROM
IC706	IC	Bus transceiver
IC707~709	IC	OR gate
IC710	IC	DSP

Ref. No.	Part Name	Description
IC711	IC	Inverter
IC712	IC	AF amplifier
IC713	IC	CODEC
IC714	IC	MIC amplifier/AGC
IC715	IC	Buffer amplifier
IC716	IC	Anti-aliasing filter
IC717	IC	Multiplexer
IC718	IC	D/A converter
IC719	IC	AF amplifier
IC720	IC	Audio power amplifier
IC721	IC	DC amplifier
IC722	IC	AF amplifier
IC723	IC	Voltage regulator
IC724	IC	Multiplexer
IC725	IC	Voltage detector
Q1,2	Transistor	RF amplifier
Q4	FET	Drive amplifier
Q5	FET	Final amplifier
Q101	Transistor	DC switch
Q102	Transistor	Switch
Q103	FET	DC switch
Q104~113	Transistor	DC switch
Q201~203	Transistor	W/N switch
Q204	Transistor	Noise amplifier
Q205	Transistor	W/N switch
Q206	Transistor	IF amplifier
Q207	Transistor	Pre IF amplifier
Q208	Transistor	RF amplifier
Q209~212	FET	Mixer
Q213	Transistor	RF amplifier
Q501	Transistor	Active filter
Q502	FET	Oscillator
Q503,504	Transistor	Active filter
Q505,506	Transistor	DC switch
Q507	FET	TX oscillator
Q508	Transistor	AVR
Q509	FET	RX oscillator
Q510	Transistor	TX/RX switch
Q511	Transistor	Ripple filter
Q512	Transistor	TX/RX switch

COMPONENTS DESCRIPTION

Ref. No.	Part Name	Description
Q513	Transistor	Buffer amplifier
Q514	Transistor	Inverter
Q515	Transistor	Buffer amplifier
Q516	Transistor	Amplifier
Q517	Transistor	Ripple filter
Q518~520	Transistor	DC switch
Q521	Transistor	Inverter
Q700	FET	DC switch
Q701~706	Transistor	DC switch
Q707,708	Transistor	MIC gain switch
Q709	Transistor	Inverter
Q710,711	Transistor	DC switch
Q712,713	FET	DC switch
Q714	Transistor	DC switch
Q716	Transistor	DC switch
Q719,720	Transistor	DC switch
D1	Zener diode	Surge protector
D2	Zener diode	Voltage protection
D3,4	Diode	ANT switch
D5,6	Diode	RF detector
D7	Diode	Temperature compensation
D11	Diode	Surge protector
D101	Diode	Protection of reverse connection
D102,103	Zener diode	Voltage reference

Ref. No.	Part Name	Description
D104~106	Diode	DC switch
D108	Diode	Surge protector
D109	Zener diode	Voltage reference
D201	Diode	DC switch
D202	Diode	Noise detection
D203~206	Diode	Wide/Narrow switch
D207~209	Varicap	BPF tuning
D501~508	Varicap	Frequency control
D509,510	Diode	Voltage doubler
D511	Varicap	Modulator
D512	Zener diode	Voltage reference
D513,514	Diode	RF switch
D515	Diode	DC switch
D700~703	Diode	Surge protector
D704	Diode	Voltage reduction
D705~709	Diode	Surge protector
D710	Zener diode	Surge protector
D711,712	Diode	AF detector
D714	Diode	DC switch
D715	Zener diode	Surge protector
D785~790	Zener diode	Surge protector
D791	Varistor	Current protector
D793	Varistor	Current protector
D794	Diode	Delay

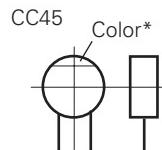
TK-7150

PARTS LIST

CAPACITORS

CC 45 TH 1H 220 J
 1 2 3 4 5 6

1 = Type ... ceramic, electrolytic, etc.
 2 = Shape ... round, square, etc.
 3 = Temp. coefficient
 4 = Voltage rating
 5 = Value
 6 = Tolerance



• Capacitor value

010 = 1pF
 100 = 10pF
 101 = 100pF
 102 = 1000pF = 0.001μF
 103 = 0.01μF

2 2 0 = 22pF
 Multiplier
 2nd number
 1st number

• Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = -470±60ppm/°C

• Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code	
(%)	±0.25	±0.5	±2	±5	±10	±20	+40	+80	+100	More than 10μF : -10~+50	
							-20	-20	-0	Less than 4.7μF : -10~+75	

(Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

• Voltage rating

1st word \ 2nd word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	2150	4000	5000	6300	8000	-

CHIP CAPACITORS

(EX) CC 73 F S L 1H 000 J
 1 2 3 4 5 6 7

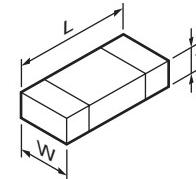
Refer to the table above.

1 = Type
 2 = Shape
 3 = Dimension
 4 = Temp. coefficient
 5 = Voltage rating
 6 = Value
 7 = Tolerance

(EX) CK 73 F F 1H 000 Z
 1 2 3 4 5 6 7

(Chip) (B, F)

• Dimension



Chip capacitor

Code	L	W	T
Empty	5.6±0.5	5.0±0.5	Less than 2.0
A	4.5±0.5	3.2±0.4	Less than 2.0
B	4.5±0.5	2.0±0.3	Less than 2.0
C	4.5±0.5	1.25±0.2	Less than 1.25
D	3.2±0.4	2.5±0.3	Less than 1.5
E	3.2±0.2	1.6±0.2	Less than 1.25
F	2.0±0.3	1.25±0.2	Less than 1.25
G	1.6±0.2	0.8±0.2	Less than 1.0
H	1.0±0.05	0.5±0.05	0.5±0.05

Chip resistor

Code	L	W	T
E	3.2±0.2	1.6±0.2	1.0
F	2.0±0.3	1.25±0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1
H	1.0±0.05	0.5±0.05	0.35±0.05

RESISTORS

• Chip resistor (Carbon)

(EX) RD 73 E B 2B 000 J
 1 2 3 4 5 6 7

(Chip) (B, F)

• Carbon resistor (Normal type)

(EX) RD 14 B B 2C 000 J
 1 2 3 4 5 6 7

(Chip) (B, F)

1 = Type ... ceramic, electrolytic, etc.
 2 = Shape ... round, square, etc.
 3 = Dimension
 4 = Temp. coefficient
 5 = Voltage rating
 6 = Value
 7 = Tolerance

• Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

PARTS LIST

* New Parts. Δ indicates safety critical components.

Parts without **Parts No.** are not supplied.Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia
Y : PX (Far East, Hawaii)
Y : AAFES (Europe)

K : USA
T : England
X : Australia

P : Canada
E : Europe
M : Other Areas

TK-7150 (Y51-4910-10)
 DISPLAY UNIT (X54-3400-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
TK-7150					
1	1B	*	A01-2185-12	CABINET	
2	3A	*	A62-1037-03	PANEL ASSY	
4	1C	*	B11-1297-04	NAME PLATE	
5	1D	*	B62-1619-00	INSTRUCTION MANUAL	
6	3A	*	B72-2075-04	MODEL NAME PLATE	
8	2A		E04-0167-05	RF COAXIAL PECEPTACLE (M)	
9	1C	*	E30-3478-05	DC CORD ASSY	
-			E37-0808-05	LEAD WIRE WITH CONNECTOR	
11	3A	*	E37-1002-15	LEAD WIRE WITH CONNECTOR	
12	1A	*	E37-1003-05	LEAD WIRE WITH CONNECTOR (6P/ACC)	
13	3A	*	E37-1004-05	LEAD WIRE WITH CONNECTOR (TXRX-CONT)	
14	1B,2C	*	E37-1031-05	LEAD WIRE WITH CONNECTOR (SHORT PLUG)	
15	1A	*	E37-1074-05	LEAD WIRE WITH CONNECTOR (DC)	
-		*	E37-1075-05	LEAD WIRE WITH CONNECTOR	
18	2C		F05-1537-05	FUSE (BLADE) (15A/32V)	
19	2B		F09-0445-05	CAP (D-SUB)	
20	2C	*	F29-0478-05	PROTECTIVE COVER	
22	2B		G02-0861-04	FLAT SPRING	
23	2B	*	G02-0894-04	EARTH SPRING	
24	2B	*	G02-0896-04	FLAT SPRING	
25	2B	*	G02-0900-04	EARTH SPRING	
26	2B	*	G02-1801-03	EARTH SPRING	
27	2B	*	G02-1802-04	EARTH SPRING	
28	1B	*	G53-1551-02	PACKING	
29	2A	*	G53-1552-03	PACKING	
30	1A	*	G53-1554-03	PACKING	
31	3A	*	G53-1555-04	PACKING	
33	3D	*	H52-1894-02	ITEM CARTON CASE	
35	2C		J19-1584-05	HOLDER	
36	2B	*	J21-8437-14	HARDWARE FIXTURE	
37	1C	*	J29-0697-03	BRACKET	
38	2C		J61-0307-05	BAND	
40	3A	*	K29-9221-03	KNOB	
41	3A	*	K29-9222-02	KEY TOP	
A	1B	*	N09-2409-05	HEXAGON HEAD SCREW	
B	3A		N10-2070-46	HEXAGON NUT	
C	1A,2B,3B		N67-3008-46	PAN HEAD SEMS SCREW W	
D	3A		N80-2606-46	PAN HEAD TAPITTE SCREW	
E	2B,3B		N87-2606-46	BRAZIER HEAD TAPITTE SCREW	
F	1B	*	N87-2620-46	BRAZIER HEAD TAPITTE SCREW	
G	1B,2B	*	N87-3008-45	BRAZIER HEAD TAPITTE SCREW	
43	2C	*	N99-2033-05	SCREW SET	
45	3A	*	T07-0738-05	SPEAKER	
46	1C		T91-0621-15	MICROPHONE	
48	3A	*	X54-3400-10	DISPLAY UNIT	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
DISPLAY UNIT (X54-3400-10)					
101	3A	*	B39-0875-05	LCD ASSY	
D908-911			B30-2254-05	LED	
D912			B30-2193-05	LED (RED)	
D913,914			B30-2254-05	LED	
D915			B30-2194-05	LED (GREEN)	
C901			CC73GCH1H101J	CHIP C 100PF J	
C902			CK73GB1H102K	CHIP C 1000PF K	
C903			CK73GB1H103K	CHIP C 0.010UF K	
C904			CK73GB1H102K	CHIP C 1000PF K	
C905,906			CC73GCH1H101J	CHIP C 100PF J	
C907			CK73GB1H102K	CHIP C 1000PF K	
C909,910			CC73GCH1H101J	CHIP C 100PF J	
C911,912			C92-0628-05	CHIP-TAN 10UF 10WV	
C914			CK73GB1H102K	CHIP C 1000PF K	
C915-917			CC73GCH1H101J	CHIP C 100PF J	
C918,919			CK73GB1H103K	CHIP C 0.010UF K	
C921			CK73GB1H103K	CHIP C 0.010UF K	
C922			CC73GCH1H060B	CHIP C 6.0PF B	
C923			CK73GB1C223K	CHIP C 0.022UF K	
C924			C92-0628-05	CHIP-TAN 10UF 10WV	
C925			CK73GB1H102K	CHIP C 1000PF K	
C926,927			CC73GCH1H270J	CHIP C 27PF J	
C928			CK73GB1H103K	CHIP C 0.010UF K	
C929,930			CK73GB1H102K	CHIP C 1000PF K	
C931			CK73GB1H103K	CHIP C 0.010UF K	
C932			CK73GB1H102K	CHIP C 1000PF K	
C933			CK73GB1H103K	CHIP C 0.010UF K	
C934,935			CK73GB1H102K	CHIP C 1000PF K	
C938,939			CK73GB1H102K	CHIP C 1000PF K	
C941,942			CK73GB1H102K	CHIP C 1000PF K	
C943			CK73GB1H103K	CHIP C 0.010UF K	
C944			CK73GB1H102K	CHIP C 1000PF K	
CN901			E40-5538-05	PIN ASSY	
CN902			E40-6140-05	PIN ASSY	
CN905			E40-5823-05	FLAT CABLE CONNECTOR	
CN906			E40-5752-05	PIN ASSY	
J901			E08-0877-05	MODULAR JACK	
W1	3A	*	E37-1057-05	LEAD WIRE WITH CONNECTOR	
L901,902			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	
X901			L77-1863-05	CRYSTAL RESONATOR (12.0MHz)	
R902			RK73GB1J104J	CHIP R 100K J 1/16W	
R904,905			R92-1252-05	CHIP R 0 OHM J 1/16W	
R906,907			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R908			RK73GB1J473J	CHIP R 47K J 1/16W	
R909			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R910			RK73GB1J104J	CHIP R 100K J 1/16W	
R913			RK73GB1J473J	CHIP R 47K J 1/16W	
R914			RK73GB1J561J	CHIP R 560 J 1/16W	
R915			R92-0670-05	CHIP R 0 OHM	
R916-918			RK73GB1J473J	CHIP R 47K J 1/16W	
R919			RK73GB1J333J	CHIP R 33K J 1/16W	
R920			RK73FB2A560J	CHIP R 56 J 1/10W	

PARTS LIST

DISPLAY UNIT (X54-3400-10)

TX-RX UNIT (X57-6570-10)

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation	Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
R922			RK73GB1J333J	CHIP R	33K	J	1/16W	C34		*	CM73F2H241J	CHIP C	240PF	J	
R923-925			RK73GB1J02J	CHIP R	1.0K	J	1/16W	C35			C93-0779-05	CERAMIC CAP	36PF	500WV	
R926,927			RK73FB2A151J	CHIP R	150	J	1/10W	C36			C93-0565-05	CHIP C	27PF	J	
R928			RK73GB1J102J	CHIP R	1.0K	J	1/16W	C37,38			C93-0602-05	CHIP C	820PF	K	
R931			RK73FB2A272J	CHIP R	2.7K	J	1/10W	C39			C93-0567-05	CHIP C	39PF	J	
R932,933			RK73GB1J102J	CHIP R	1.0K	J	1/16W	C40			C93-0602-05	CHIP C	820PF	K	
R934			RK73FB2A272J	CHIP R	2.7K	J	1/10W	C42,43			CC73GCH1H0R5C	CHIP C	0.5PF	C	
R935-941			RK73GB1J473J	CHIP R	47K	J	1/16W	C44			CM73F2H390J	CHIP C	39PF	J	
R942			RK73GB1J472J	CHIP R	4.7K	J	1/16W	C45			CK73GB1H102K	CHIP C	1000PF	K	
R943			RK73GB1J333J	CHIP R	33K	J	1/16W	C46			C93-0566-05	CHIP C	33PF	J	
R944			RK73GB1J471J	CHIP R	470	J	1/16W	C47,48			CC73GCH1H0R5C	CHIP C	0.5PF	C	
R945			RK73GB1J6R8J	CHIP R	6.8	J	1/16W	C49			CK73GB1H102K	CHIP C	1000PF	K	
R946,947			R92-2021-05	CHIP R	2.2	J	1/2W	C50			C93-0565-05	CHIP C	27PF	J	
R948			RK73GB1J104J	CHIP R	100K	J	1/16W	C51			CK73GB1H102K	CHIP C	1000PF	K	
R949			RK73GB1J102J	CHIP R	1.0K	J	1/16W	C53			CK73GB1H102K	CHIP C	1000PF	K	
R950			RK73GB1J224J	CHIP R	220K	J	1/16W	C54			CC73GCH1H040C	CHIP C	4.0PF	C	
R951			RK73GB1J102J	CHIP R	1.0K	J	1/16W	C62			CC73FCH1H100D	CHIP C	10PF	D	
R952-955			RK73GB1J104J	CHIP R	100K	J	1/16W	C63			CK73FB1E224K	CHIP C	0.22UF	K	
R956-959			RK73GB1J102J	CHIP R	1.0K	J	1/16W	C65			CK73GB1H102K	CHIP C	1000PF	K	
R960			RK73GB1J472J	CHIP R	4.7K	J	1/16W	C67			CK73GB1E473J	CHIP C	0.047UF	J	
VR901			R31-0630-05	VARIABLE RESISTOR				C74			C93-0564-05	CHIP C	22PF	J	
S1	3A	*	S60-0423-05	ROTARY SWITCH				C75			CC73GCH1H150J	CHIP C	15PF	J	
D902-906			DA204U	DIODE				C77			CM73F2H220J	CHIP C	22PF	J	
D907			02CZ9.1(X,Y)	ZENER DIODE				C80			CK73GB1H102K	CHIP C	1000PF	K	
D916			02DZ18(X,Y)	ZENER DIODE				C89			CM73F2H300J	CHIP C	30PF	J	
D917		*	MINISMDC020	VARISTOR				C90		*	CM73F2H300J	CHIP C	30PF	J	
D918			02DZ18(X,Y)	ZENER DIODE				C92			C90-4085-05	ELECTRO CAP	47UF	20WV	
IC901			TA7805F	MOS IC				C93,94			C90-5299-05	ELECTRO CAP	470UF	25WV	
IC902			RH5VL42C	MOS IC				C101			C92-0777-05	ELECTRO CAP	1000UF	25WV	
IC904		*	30622M4A-443GP	MPU				C102			CK73GB1E473J	CHIP C	0.047UF	J	
Q901			2SJ243	FET				C103			CC73GCH1H471J	CHIP C	470PF	J	
Q902			2SK1824	FET				C104			CC73GCH1H101J	CHIP C	100PF	J	
Q903			2SD1760	TRANSISTOR				C105,106			CK73GB1E473J	CHIP C	0.047UF	J	
Q904-908			DTC114EE	DIGITAL TRANSISTOR				C107			CC73GCH1H471J	CHIP C	470PF	J	
Q909-911			DTC144EE	DIGITAL TRANSISTOR				C108			C92-0754-05	CHIP-TAN	4.7UF	20WV	

TX-RX UNIT (X57-6570-10)

C1-3			CK73GB1H102K	CHIP C	1000PF	K		C117-119			CK73FB1C105K	CHIP C	1.0UF	K	
C4			CC73GCH1H100D	CHIP C	10PF	D		C120			CK73GB1E473J	CHIP C	0.047UF	J	
C5-9			CK73GB1H102K	CHIP C	1000PF	K		C121			CK73GB1H102K	CHIP C	1000PF	K	
C10			CC73GCH1H390J	CHIP C	39PF	J		C122,123			CK73GB1C104K	CHIP C	0.10UF	K	
C11-14			CK73GB1H102K	CHIP C	1000PF	K		C124-126			CC73GCH1H101J	CHIP C	100PF	J	
C15			CC73GCH1H270J	CHIP C	27PF	J		C127			C92-0585-05	CHIP-TAN	4.7UF	16WV	
C16			CK73GB1H102K	CHIP C	1000PF	K		C128-131			C92-0628-05	CHIP-TAN	10UF	10WV	
C17			CC73GCH1H220J	CHIP C	22PF	J		C132			CK73GB1H102K	CHIP C	1000PF	K	
C18,19			CK73GB1H102K	CHIP C	1000PF	K		C133			C92-0585-05	CHIP-TAN	4.7UF	16WV	
C20			CC73GCH1H330J	CHIP C	33PF	J		C134			CK73FB1E224K	CHIP C	0.22UF	K	
C21			CC73GCH1H820J	CHIP C	82PF	J		C135			C92-0628-05	CHIP-TAN	10UF	10WV	
C22			CK73FB1H102K	CHIP C	1000PF	K		C200			CK73GB1C104K	CHIP C	0.10UF	K	
C23,24			C93-0602-05	CHIP C	820PF	K		C201			CK73FB1E224K	CHIP C	0.22UF	K	
C25			CC73FCH1H470J	CHIP C	47PF	J		C202			CK73GB1H102K	CHIP C	1000PF	K	
C26			CK73GB1H102K	CHIP C	1000PF	K		C203			CK73GB1C104K	CHIP C	0.10UF	K	
C27			CC73FCH1H121J	CHIP C	120PF	J		C204,205			CK73GB1H102K	CHIP C	1000PF	K	
C29			CK73FB1H102K	CHIP C	1000PF	K		C206			CK73GB1H152K	CHIP C	1500PF	K	
C30			CK73GB1H102K	CHIP C	1000PF	K		C207			CK73GB1C104K	CHIP C	0.10UF	K	
C31			C93-0603-05	CHIP C	1000PF	K		C208,209			CC73GCH1H271J	CHIP C	270PF	J	
C32,33			CK73GB1H102K	CHIP C	1000PF	K		C210			CK73GB1H102K	CHIP C	1000PF	K	

PARTS LIST

TX-RX UNIT (X57-6570-10)

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation	Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
C211			CK73GB1C104K	CHIP C	0.10UF	K		C286			CC73GCH1H120J	CHIP C	12PF	J	
C212			CK73GB1H103K	CHIP C	0.010UF	K		C287			CK73GB1H103K	CHIP C	0.010UF	K	
C213			CC73GCH1H270J	CHIP C	27PF	J		C288			CK73GB1H102K	CHIP C	1000PF	K	
C214			CK73GB1C104K	CHIP C	0.10UF	K		C289			CC73GCH1H270J	CHIP C	27PF	J	
C215			C92-0560-05	CHIP-TAN	10UF	6.3WV		C290			CC73GCH1H100D	CHIP C	10PF	D	
C216			CK73GB1C333K	CHIP C	0.033UF	K		C291,292			CC73GCH1H221J	CHIP C	220PF	J	
C217,218			CK73GB1H103K	CHIP C	0.010UF	K		C293			CC73GCH1H270J	CHIP C	27PF	J	
C219			C92-0560-05	CHIP-TAN	10UF	6.3WV		C294			CK73GB1H103K	CHIP C	0.010UF	K	
C220			CK73GB1H103K	CHIP C	0.010UF	K		C295			CK73GB1H102K	CHIP C	1000PF	K	
C221			CC73GCH1H180J	CHIP C	18PF	J		C305			CK73GB1C104K	CHIP C	0.10UF	K	
C222			CC73GCH1H150J	CHIP C	15PF	J		C306			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C223			CK73GB1H102K	CHIP C	1000PF	K		C501			CK73GB1H102K	CHIP C	1000PF	K	
C224			CK73GB1H103K	CHIP C	0.010UF	K		C502			C92-0514-05	CHIP-TAN	2.2UF	10WV	
C225			CK73GB1C104K	CHIP C	0.10UF	K		C503			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C226			CC73GCH1H080D	CHIP C	8.0PF	D		C504			CK73FB1E683K	CHIP C	0.068UF	K	
C227			CC73GCH1H101J	CHIP C	100PF	J		C505,506			CK73GB1H102K	CHIP C	1000PF	K	
C228			CC73GCH1H100D	CHIP C	10PF	D		C507			C92-0502-05	CHIP-TAN	0.33UF	35WV	
C229,230			CK73GB1H103K	CHIP C	0.010UF	K		C508			CK73GB1C104K	CHIP C	0.10UF	K	
C231,232			CC73GCH1H470J	CHIP C	47PF	J		C509			C92-0585-05	CHIP-TAN	4.7UF	16WV	
C233,234			CK73GB1H103K	CHIP C	0.010UF	K		C510			CC73GCH1H100D	CHIP C	10PF	D	
C235,236			CC73GCH1H010C	CHIP C	1.0PF	C		C512			CK73GB1H103K	CHIP C	0.010UF	K	
C237			CC73GCH1H101J	CHIP C	100PF	J		C513			C92-0585-05	CHIP-TAN	4.7UF	16WV	
C238,239			CC73GCH1H030C	CHIP C	3.0PF	C		C514			CK73GB1H102K	CHIP C	1000PF	K	
C240			CK73GB1H102K	CHIP C	1000PF	K		C515			CK73GB1C104K	CHIP C	0.10UF	K	
C241,242			CC73GCH1H010C	CHIP C	1.0PF	C		C516			CK73GB1H102K	CHIP C	1000PF	K	
C243,244			CK73GB1H103K	CHIP C	0.010UF	K		C517			CK73GB1C104K	CHIP C	0.10UF	K	
C245,246			CC73GCH1H470J	CHIP C	47PF	J		C519			CK73GB1H102K	CHIP C	1000PF	K	
C247			CK73GB1H102K	CHIP C	1000PF	K		C520			CK73FB1E224K	CHIP C	0.22UF	K	
C248			CC73GCH1H151J	CHIP C	150PF	J		C521			C92-0003-05	CHIP-TAN	0.47UF	25WV	
C249			CK73GB1H103K	CHIP C	0.010UF	K		C522			CC73GCH1H471J	CHIP C	470PF	J	
C251			CC73GCH1H330J	CHIP C	33PF	J		C523-525			CK73GB1C104K	CHIP C	0.10UF	K	
C252			CC73GCH1H101J	CHIP C	100PF	J		C526			CK73GB1H102K	CHIP C	1000PF	K	
C253			CK73GB1H103K	CHIP C	0.010UF	K		C527			C92-0628-05	CHIP-TAN	10UF	10WV	
C254			CC73GCH1H221J	CHIP C	220PF	J		C528			CC73GCH1H150G	CHIP C	15PF	G	
C255,256			CK73GB1H102K	CHIP C	1000PF	K		C529			CC73GCH1H030B	CHIP C	3.0PF	B	
C257			CC73GCH1H680J	CHIP C	68PF	J		C530			CK73GB1C104K	CHIP C	0.10UF	K	
C258			CC73GCH1H090D	CHIP C	9.0PF	D		C531			CC73GCH1H270G	CHIP C	27PF	G	
C259			CC73GCH1H150J	CHIP C	15PF	J		C532	*	*	CC73GCH1H680G	CHIP C	68PF	G	
C260			CC73GCH1H270J	CHIP C	27PF	J		C533	*	*	CC73GCH1H560G	CHIP C	56PF	G	
C261			CK73GB1H103K	CHIP C	0.010UF	K		C534	*	*	CC73GCH1H030B	CHIP C	3.0PF	B	
C262			CC73GCH1H030C	CHIP C	3.0PF	C		C535			CC73GCH1H150G	CHIP C	15PF	G	
C263			CK73GB1C104K	CHIP C	0.10UF	K		C537			CK73GB1C104K	CHIP C	0.10UF	K	
C264			CC73GCH1H270J	CHIP C	27PF	J		C538			CC73GCH1H471J	CHIP C	470PF	J	
C265			CC73GCH1H030C	CHIP C	3.0PF	C		C539			CC73GCH1H150G	CHIP C	15PF	G	
C266			CC73GCH1H150J	CHIP C	15PF	J		C540	*	*	CC73GCH1H470G	CHIP C	47PF	G	
C267-269			CK73GB1H103K	CHIP C	0.010UF	K		C541			CC73GCH1H330G	CHIP C	33PF	G	
C270			CC73GCH1H050C	CHIP C	5.0PF	C		C542			CK73GB1C104K	CHIP C	0.10UF	K	
C271			CK73GB1H102K	CHIP C	1000PF	K		C543			CC73GCH1HR75B	CHIP C	0.75PF	B	
C272			CC73GCH1H270J	CHIP C	27PF	J		C544,545			CK73GB1H102K	CHIP C	1000PF	K	
C273			CC73GCH1H100D	CHIP C	10PF	D		C546,547			CC73GCH1H090B	CHIP C	9.0PF	B	
C274			CC73GCH1H221J	CHIP C	220PF	J		C548,549			CC73GCH1H150G	CHIP C	15PF	G	
C276			CC73GCH1H270J	CHIP C	27PF	J		C550			CK73GB1H102K	CHIP C	1000PF	K	
C277			CK73GB1H103K	CHIP C	0.010UF	K		C551			CC73GCH1H150G	CHIP C	15PF	G	
C278			CC73GCH1H151J	CHIP C	150PF	J		C552,553			CK73GB1H102K	CHIP C	1000PF	K	
C279			CC73GCH1H270J	CHIP C	27PF	J		C554			CC73GCH1H010B	CHIP C	1.0PF	B	
C280			CC73GCH1H100D	CHIP C	10PF	D		C555			CK73GB1H102K	CHIP C	1000PF	K	
C281,282			CC73GCH1H221J	CHIP C	220PF	J		C556			CC73GCH1H010B	CHIP C	1.0PF	B	
C283			CC73GCH1H270J	CHIP C	27PF	J		C557			CK73GB1H103K	CHIP C	0.010UF	K	
C284			CK73GB1H103K	CHIP C	0.010UF	K		C559			CK73GB1H102K	CHIP C	1000PF	K	
C285			CK73GB1H102K	CHIP C	1000PF	K		C560,561	*	*	C90-4085-05	ELECTRO CAP	47UF	20WV	

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Ref. No.	Address	New parts	Parts No.	Description		Desti-nation	Ref. No.	Address	New parts	Parts No.	Description		Desti-nation	
C562			CK73GB1H102K	CHIP C	1000PF	K	C766			CC73GCH1H151J	CHIP C	150PF	J	
C563			CK73GB1H103K	CHIP C	0.010UF	K	C767			C92-0628-05	CHIP-TAN	10UF	10WV	
C564			CC73GCH1H150J	CHIP C	15PF	J	C768,769			CK73GB1C104K	CHIP C	0.10UF	K	
C565			CK73GB1H102K	CHIP C	1000PF	K	C770			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C567-573			CK73GB1H102K	CHIP C	1000PF	K	C771,772			C92-0628-05	CHIP-TAN	10UF	10WV	
C574			CK73GB1H103K	CHIP C	0.010UF	K	C773			CC73GCH1H470J	CHIP C	47PF	J	
C575			CC73GCH1H150J	CHIP C	15PF	J	C774			CK73GB1C104K	CHIP C	0.10UF	K	
C576			C92-0633-05	CHIP-TAN	22UF	10WV	C775,776			CK73GB1H103K	CHIP C	0.010UF	K	
C577			CC73GCH1H150J	CHIP C	15PF	J	C777			CK73GB1C104K	CHIP C	0.10UF	K	
C578			CK73GB1H102K	CHIP C	1000PF	K	C778			C92-0628-05	CHIP-TAN	10UF	10WV	
C579			C92-0696-05	CHIP-TAN	47UF	10WV	C779,780			CC73GCH1H101J	CHIP C	100PF	J	
C580			CK73GB1H102K	CHIP C	1000PF	K	C781,782			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C581			CK73GB1H103K	CHIP C	0.010UF	K	C784			CC73GCH1H390J	CHIP C	39PF	J	
C584			C92-0606-05	CHIP-TAN	4.7UF	10WV	C785			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C585,587			CK73GB1H102K	CHIP C	1000PF	K	C787			CK73GB1H102K	CHIP C	1000PF	K	
C593			CK73FB1E683K	CHIP C	0.068UF	K	C788			C92-0628-05	CHIP-TAN	10UF	10WV	
C594			CK73GB1H102K	CHIP C	1000PF	K	C789			CK73GB1H102K	CHIP C	1000PF	K	
C700,701			CK73GB1H103K	CHIP C	0.010UF	K	C790			CK73GB1H103K	CHIP C	0.010UF	K	
C702			CK73GB1C104K	CHIP C	0.10UF	K	C793			CC73GCH1H330J	CHIP C	33PF	J	
C703			CC73GCH1H030C	CHIP C	3.0PF	C	C794			C92-0628-05	CHIP-TAN	10UF	10WV	
C704,705			CC73GCH1H220J	CHIP C	22PF	J	C795			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C706-708			CK73GB1H103K	CHIP C	0.010UF	K	C796			CK73GB1H152K	CHIP C	1500PF	K	
C709,710			C92-0519-05	CHIP-TAN	1.0UF	25WV	C797-799			CK73GB1H103K	CHIP C	0.010UF	K	
C711			CK73FB1C105K	CHIP C	1.0UF	K	C800,801			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C712,713			C92-0519-05	CHIP-TAN	1.0UF	25WV	C802			CC73GCH1H680J	CHIP C	68PF	J	
C714			CK73GB1C104K	CHIP C	0.10UF	K	C803			CK73GB1H122K	CHIP C	1200PF	K	
C715			CK73FB1C105K	CHIP C	1.0UF	K	C804			CK73GB1H102K	CHIP C	1000PF	K	
C716			CK73GB1H103K	CHIP C	0.010UF	K	C805			C92-0712-05	CHIP-TAN	22UF	6.3WV	
C717,718			CK73GB1C104K	CHIP C	0.10UF	K	C806,807			CK73GB1H103K	CHIP C	0.010UF	K	
C719-721			CK73FB1C105K	CHIP C	1.0UF	K	C808			C92-0628-05	CHIP-TAN	10UF	10WV	
C722-724			CK73GB1H103K	CHIP C	0.010UF	K	C809			C92-0719-05	ELECTRO CAP	47UF	25WV	
C725			CK73FB1C105K	CHIP C	1.0UF	K	C810			CK73GB1H102K	CHIP C	1000PF	K	
C726			CK73GB1H103K	CHIP C	0.010UF	K	C811			CC73GCH1H101J	CHIP C	100PF	J	
C727			CK73FB1C105K	CHIP C	1.0UF	K	C812			C90-2146-05	ELECTRO	100UF	25WV	
C728			CK73GB1H103K	CHIP C	0.010UF	K	C813			CK73GB1C104K	CHIP C	0.10UF	K	
C729			CK73GB1H102K	CHIP C	1000PF	K	C814			CK73GB1H103K	CHIP C	0.010UF	K	
C730,731			CC73GCH1H101J	CHIP C	100PF	J	C815,816			CK73GB1C104K	CHIP C	0.10UF	K	
C732,733			CK73GB1H102K	CHIP C	1000PF	K	C817			CK73GB1H103K	CHIP C	0.010UF	K	
C734			CC73GCH1H101J	CHIP C	100PF	J	C819			C92-0719-05	ELECTRO CAP	47UF	25WV	
C735,736			CK73GB1H102K	CHIP C	1000PF	K	C820			CK73GB1H103K	CHIP C	0.010UF	K	
C737			CC73GCH1H101J	CHIP C	100PF	J	C822			CK73GB1C104K	CHIP C	0.10UF	K	
C738			CK73GB1H102K	CHIP C	1000PF	K	C823			CC73GCH1H101J	CHIP C	100PF	J	
C739			CK73FB1C105K	CHIP C	1.0UF	K	C825-830			CK73GB1H102K	CHIP C	1000PF	K	
C740			CK73GB1H102K	CHIP C	1000PF	K	C831			CK73GB1C104K	CHIP C	0.10UF	K	
C741			CK73GB1H103K	CHIP C	0.010UF	K	C832			CC73GCH1H101J	CHIP C	100PF	J	
C742			CK73GB1H102K	CHIP C	1000PF	K	C833			CK73GB1C104K	CHIP C	0.10UF	K	
C743			CK73GB1C104K	CHIP C	0.10UF	K	C834			CK73GB1H103K	CHIP C	0.010UF	K	
C744			CC73GCH1H101J	CHIP C	100PF	J	C835			CC73GCH1H470J	CHIP C	47PF	J	
C745			CK73FB1C105K	CHIP C	1.0UF	K	C836			C92-0628-05	CHIP-TAN	10UF	10WV	
C746			CC73GCH1H101J	CHIP C	100PF	J	C837,838			CK73GB1C104K	CHIP C	0.10UF	K	
C747			CK73GB1H103K	CHIP C	0.010UF	K	C844			CK73GB1H102K	CHIP C	1000PF	K	
C748			CC73GCH1H101J	CHIP C	100PF	J	C845			C92-0628-05	CHIP-TAN	10UF	10WV	
C749			CK73GB1H102K	CHIP C	1000PF	K	C846			CK73GB1H102K	CHIP C	1000PF	K	
C750			CK73FB1C105K	CHIP C	1.0UF	K	TC501,502			C05-0396-05	CERAMIC TRIMMER CAP (8P)			
C751-755			CK73GB1H103K	CHIP C	0.010UF	K	CN102		*	E23-1233-04	TERMINAL			
C756-759			CK73FB1C105K	CHIP C	1.0UF	K	CN201-203		*	E40-5538-05	PIN ASSY			
C760			CC73GCH1H471J	CHIP C	470PF	J	CN700,701		*	E40-9370-05	PIN ASSY			
C761			CC73GCH1H220J	CHIP C	22PF	J	CN703		*	E40-5176-05	PIN ASSY			
C762			CK73GB1H103K	CHIP C	0.010UF	K	CN704		*	E40-3241-05	PIN ASSY			
C764,765			C92-0501-05	CHIP-TAN	1.5UF	10WV								

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Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
CN731-756 J700		*	E23-1081-05 E58-0494-05	TERMINAL SUB SOCKET (D)		L703 L704-713 X201 X501 X700			L92-0138-05 L92-0140-05 L77-1762-05 *	FERRITE CHIP FERRITE CHIP CRYSTAL RESONATOR (44.395MHZ) CRYSTAL RESONATOR (16.8MHZ/2.5PP)	
F100		*	F53-0278-05	FUSE		X700		*	L77-1902-05 L77-1896-05	CRYSTAL RESONATOR (12.288MHZ)	
CF201 CF202 CF203 CF204 L2,3		*	L72-1002-05 L72-0372-05 L72-1002-05 L72-0372-05 L40-6875-92	CERAMIC FILTER CERAMIC FILTER CERAMIC FILTER CERAMIC FILTER SMALL FIXED INDUCTOR (68NH)		XF201 XF202		L71-0512-05 L71-0513-05	MCF (44.85MHZ WIDE) MCF (44.85MHZ NARR)		
L4 L5 L6 L7 L8		*	L41-2775-20 L41-1875-20 L34-4520-05 L34-4602-05 L34-4520-05	SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR AIR-CORE COIL AIR-CORE COIL AIR-CORE COIL		CP700-715		R90-0740-05	MULTIPLE RESISTOR		
L9 L10 L11-14 L15 L16,17			L34-4518-05 L34-4523-05 L34-4520-05 L34-4523-05 L40-5675-92	AIR-CORE COIL AIR-CORE COIL AIR-CORE COIL AIR-CORE COIL SMALL FIXED INDUCTOR (56NH)		R1 R2 R4 R5 R6 R7 R9 R10 R11		RK73GB1J102J RK73GB1J180J RK73GB1J100J RK73GB1J472J RK73GB1J471J RK73GB1J470J RK73GB1J220J RK73GB1J222J RK73GB1J101J	CHIP R 1.0K J 1/16W CHIP R 18 J 1/16W CHIP R 10 J 1/16W CHIP R 4.7K J 1/16W CHIP R 470 J 1/16W CHIP R 47 J 1/16W CHIP R 22 J 1/16W CHIP R 2.2K J 1/16W CHIP R 100 J 1/16W		
L201 L202,203 L204 L205 L206			L34-4530-05 L40-1095-34 L40-1005-34 L34-4526-05 L34-4527-05	COIL SMALL FIXED INDUCTOR (1UH) SMALL FIXED INDUCTOR (10UH) COIL COIL		R12 R13 R14 R15 R16 *		RK73FB2A100J RK73FB2A180J R92-1252-05 RK73FB2A180J R92-3513-05	CHIP R 10 J 1/10W CHIP R 18 J 1/10W CHIP R 0 OHM J 1/16W CHIP R 18 J 1/10W RESISTOR 0.003 1W		
L207 L208 L209 L210 L211			L34-4526-05 L34-4527-05 L34-4526-05 L34-4527-05 L40-1005-34	COIL COIL COIL COIL SMALL FIXED INDUCTOR (10UH)		R17,18 R19,20 R21 R22 R23		RK73GB1J104J RK73GB1J563J RK73FB2A101J RK73GB1J154J RK73GB1J104J	CHIP R 100K J 1/16W CHIP R 56K J 1/16W CHIP R 100 J 1/10W CHIP R 150K J 1/16W CHIP R 100K J 1/16W		
L212 L213 L214 L215 L216,217			L40-3381-37 L40-1281-37 L40-3975-34 L40-1885-34 L40-3375-34	SMALL FIXED INDUCTOR (0.330UH) SMALL FIXED INDUCTOR (0.120UH) SMALL FIXED INDUCTOR (39NH) SMALL FIXED INDUCTOR (180NH) SMALL FIXED INDUCTOR (33NH)		R24 R26 R27 R28 R29		RK73GB1J103J R92-1252-05 RK73GB1J474J RK73GB1J103J R92-1252-05	CHIP R 10K J 1/16W CHIP R 0 OHM J 1/16W CHIP R 470K J 1/16W CHIP R 10K J 1/16W CHIP R 0 OHM J 1/16W		
L218 L219 L220 L221,222 L223			L39-1272-05 L40-6895-34 L40-3375-34 L39-1272-05 L40-1005-34	TOROIDAL COIL SMALL FIXED INDUCTOR (6.8UH) SMALL FIXED INDUCTOR (33NH) TOROIDAL COIL SMALL FIXED INDUCTOR (10UH)		R31 R32,33 R34 R36 R37		RK73GB1J101J RK73GB1J104J RK73EB2B101J RK73GB1J334J RK73GB1J104J	CHIP R 100 J 1/16W CHIP R 100K J 1/16W CHIP R 100 J 1/8W CHIP R 330K J 1/16W CHIP R 100K J 1/16W		
L224 L225 L501 L503 L504			L40-8271-34 L40-1085-34 L92-0138-05 L40-5695-34 *	SMALL FIXED INDUCTOR (82NH) SMALL FIXED INDUCTOR (100NH) FERRITE CHIP SMALL FIXED INDUCTOR (5.6UH) L41-3398-08		R38,39 R40,41 R42,43 R44 R45-47		RK73GB1J103J R92-1252-05 RK73GB1J104J R92-1214-05 RK73GB1J473J	CHIP R 10K J 1/16W CHIP R 0 OHM J 1/16W CHIP R 100K J 1/16W CHIP R 120 J 1/2W CHIP R 47K J 1/16W		
L505 L506 L507 L508 L509		*	L41-2798-08 L40-3975-92 L41-3398-08 L41-2798-08 L40-3975-92	SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR (39NH) SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR (39NH)		R48,49 R50 R51,52 R53 R54,55		RK73GB1J271J RK73GB1J681J RK73GB1J102J RK73GB1J471J RK73FB2A271J	CHIP R 270 J 1/16W CHIP R 680 J 1/16W CHIP R 1.0K J 1/16W CHIP R 470 J 1/16W CHIP R 270 J 1/10W		
L510 L511 L512,513 L514 L515		*	L34-4610-05 L34-4612-05 L40-1015-34 L41-2798-08 L41-3398-08	AIR-CORE COIL AIR-CORE COIL SMALL FIXED INDUCTOR (100UH) SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR		R56 R58 R59 R60 R101 R102		R92-1252-05 R92-1061-05 R92-1061-05 RK73GB1J471J RK73GB1J474J RK73GB1J394J	CHIP R 0 OHM J 1/16W CHIP R 100K J 1/16W CHIP R 0 OHM J 1/16W CHIP R 470 J 1/16W CHIP R 470K J 1/16W CHIP R 390K J 1/16W		
L516 L517 L519 L520 L700,701		*	L41-2798-08 L40-1085-92 L40-8275-92 L40-1085-92 L92-0138-05	SMALL FIXED INDUCTOR SMALL FIXED INDUCTOR (100NH) SMALL FIXED INDUCTOR (82NH) SMALL FIXED INDUCTOR (100NH) FERRITE CHIP		R103 R104,105 R106 R107-109 R110,111 R112 R113		RK73GB1J471J RK73GB1J334J RK73GB1J472J RK73GB1J473J RK73GB1J472J RK73GB1J102J RK73GB1J104J	CHIP R 470 J 1/16W CHIP R 330K J 1/16W CHIP R 4.7K J 1/16W CHIP R 47K J 1/16W CHIP R 47K J 1/16W CHIP R 1.0K J 1/16W CHIP R 100K J 1/16W		

PARTS LIST

TX-RX UNIT (X57-6570-10)

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation	Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
R114			RK73GB1J473J	CHIP R	47K	J	1/16W	R256			RK73GB1J103J	CHIP R	10K	J	1/16W
R115			RK73GB1J104J	CHIP R	100K	J	1/16W	R257,258			RK73GB1J100J	CHIP R	10	J	1/16W
R116			RK73GB1J473J	CHIP R	47K	J	1/16W	R259			RK73GB1J101J	CHIP R	100	J	1/16W
R117			RK73GB1J103J	CHIP R	10K	J	1/16W	R260,261			RK73GB1J103J	CHIP R	10K	J	1/16W
R118			RK73GB1J104J	CHIP R	100K	J	1/16W	R262,263			RK73GB1J271J	CHIP R	270	J	1/16W
R119			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R264			R92-1252-05	CHIP R	0 OHM	J	1/16W
R120			RK73GB1J103J	CHIP R	10K	J	1/16W	R265			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R121			RK73GB1J333J	CHIP R	33K	J	1/16W	R266,267			RK73GB1J104J	CHIP R	100K	J	1/16W
R122			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R268			RK73GB1J221J	CHIP R	220	J	1/16W
R123			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R269			RK73GB1J470J	CHIP R	47	J	1/16W
R124			RK73GB1J333J	CHIP R	33K	J	1/16W	R270			RK73GB1J120J	CHIP R	12	J	1/16W
R125			RK73GB1J473J	CHIP R	47K	J	1/16W	R271			RK73GB1J473J	CHIP R	47K	J	1/16W
R126			R92-1252-05	CHIP R	0 OHM	J	1/16W	R272			RK73GB1J472J	CHIP R	4.7K	J	1/16W
R200			RK73GB1J563J	CHIP R	56K	J	1/16W	R273			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R202			RK73GB1J393J	CHIP R	39K	J	1/16W	R274			RK73GB1J104J	CHIP R	100K	J	1/16W
R203			RK73GB1J334J	CHIP R	330K	J	1/16W	R276			R92-1252-05	CHIP R	0 OHM	J	1/16W
R204,205			RK73GB1J332J	CHIP R	3.3K	J	1/16W	R284,285			RK73GB1J221J	CHIP R	220	J	1/16W
R206			RK73GB1J152J	CHIP R	1.5K	J	1/16W	R286			RK73GB1J224J	CHIP R	220K	J	1/16W
R207			RK73GB1J560J	CHIP R	56	J	1/16W	R287			RK73GB1J683J	CHIP R	68K	J	1/16W
R208			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R288			RK73GB1J154J	CHIP R	150K	J	1/16W
R209			RK73GB1J334J	CHIP R	330K	J	1/16W	R289			R92-0670-05	CHIP R	0 OHM		
R210			RK73GB1J222J	CHIP R	2.2K	J	1/16W	R501			RK73GB1J220J	CHIP R	22	J	1/16W
R211			RK73GB1J332J	CHIP R	3.3K	J	1/16W	R502			RK73GB1J221J	CHIP R	220	J	1/16W
R212			RK73GB1J274J	CHIP R	270K	J	1/16W	R503			RK73GB1J561J	CHIP R	560	J	1/16W
R213			RK73GB1J273J	CHIP R	27K	J	1/16W	R504			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R214			RK73GB1J153J	CHIP R	15K	J	1/16W	R505			RK73GB1J100J	CHIP R	10	J	1/16W
R215			RK73GB1J682J	CHIP R	6.8K	J	1/16W	R506			R92-0670-05	CHIP R	0 OHM		
R216,217			RK73GB1J223J	CHIP R	22K	J	1/16W	R507-509			RK73GB1J100J	CHIP R	10	J	1/16W
R218			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R510			RK73GB1J104J	CHIP R	100K	J	1/16W
R219			RK73GB1J682J	CHIP R	6.8K	J	1/16W	R511			RK73GB1J103J	CHIP R	10K	J	1/16W
R220			RK73GB1J223J	CHIP R	22K	J	1/16W	R512			RK73GB1J474J	CHIP R	470K	J	1/16W
R221			RK73GB1J153J	CHIP R	15K	J	1/16W	R513			R92-1252-05	CHIP R	0 OHM	J	1/16W
R222			RK73GB1J103J	CHIP R	10K	J	1/16W	R514			RK73GB1J470J	CHIP R	47	J	1/16W
R223			RK73GB1J220J	CHIP R	22	J	1/16W	R515			R92-2072-05	CHIP R	1.5K	J	1/2W
R224			RK73GB1J101J	CHIP R	100	J	1/16W	R516			RK73GB1J473J	CHIP R	47K	J	1/16W
R225			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R517			RK73GB1J100J	CHIP R	10	J	1/16W
R226			RK73GB1J473J	CHIP R	47K	J	1/16W	R518			RK73GB1J272J	CHIP R	2.7K	J	1/16W
R227-229			RK73GB1J222J	CHIP R	2.2K	J	1/16W	R519			RK73GB1J100J	CHIP R	10	J	1/16W
R230			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R520			RK73GB1J151J	CHIP R	150	J	1/16W
R231-233			RK73GB1J222J	CHIP R	2.2K	J	1/16W	R521			RK73GB1J561J	CHIP R	560	J	1/16W
R234			R92-1252-05	CHIP R	0 OHM	J	1/16W	R522			RK73GB1J220J	CHIP R	22	J	1/16W
R235			RK73GB1J560J	CHIP R	56	J	1/16W	R523			RK73GB1J560J	CHIP R	56	J	1/16W
R236			RK73GB1J270J	CHIP R	27	J	1/16W	R524			R92-1252-05	CHIP R	0 OHM	J	1/16W
R237			RK73GB1J682J	CHIP R	6.8K	J	1/16W	R525			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R238			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R526			R92-1252-05	CHIP R	0 OHM	J	1/16W
R239			R92-1252-05	CHIP R	0 OHM	J	1/16W	R527			RK73GB1J23J	CHIP R	12K	J	1/16W
R240			RK73GB1J182J	CHIP R	1.8K	J	1/16W	R528			RK73GB1J683J	CHIP R	68K	J	1/16W
R241			RK73GB1J103J	CHIP R	10K	J	1/16W	R529			RK73GB1J123J	CHIP R	12K	J	1/16W
R242			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R530			RK73GB1J223J	CHIP R	22K	J	1/16W
R243			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R531			RK73GB1J103J	CHIP R	10K	J	1/16W
R244			RK73GB1J330J	CHIP R	33	J	1/16W	R532			RK73GB1J104J	CHIP R	100K	J	1/16W
R245			RK73GB1J220J	CHIP R	22	J	1/16W	R533			RK73GB1J152J	CHIP R	1.5K	J	1/16W
R246			RK73GB1J470J	CHIP R	47	J	1/16W	R534,535			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R247			RK73GB1J821J	CHIP R	820	J	1/16W	R536			RK73GB1J391J	CHIP R	390	J	1/16W
R248			RK73GB1J5R6J	CHIP R	5.6	J	1/16W	R537			RK73GB1J221J	CHIP R	220	J	1/16W
R249,250			RK73GB1J821J	CHIP R	820	J	1/16W	R538			RK73GB1J100J	CHIP R	10	J	1/16W
R251			RK73GB1J5R6J	CHIP R	5.6	J	1/16W	R539,540			RK73GB1J101J	CHIP R	100	J	1/16W
R252			RK73GB1J821J	CHIP R	820	J	1/16W	R541			RK73GB1J152J	CHIP R	1.5K	J	1/16W
R253			RK73GB1J101J	CHIP R	100	J	1/16W	R542,543			RK73GB1J472J	CHIP R	4.7K	J	1/16W
R254,255			RK73GB1J100J	CHIP R	10	J	1/16W	R544			RK73GB1J224J	CHIP R	220K	J	1/16W

PARTS LIST

TX-RX UNIT (X57-6570-10)

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation	Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
R546			RK73GB1J330J	CHIP R	33	J	1/16W	R774			RK73GB1J472J	CHIP R	4.7K	J	1/16W
R547			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R775-777			RK73GB1J473J	CHIP R	47K	J	1/16W
R548			RK73GB1J103J	CHIP R	10K	J	1/16W	R778			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R549			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R779,780			RK73GB1J473J	CHIP R	47K	J	1/16W
R550			R92-1252-05	CHIP R	0 OHM	J	1/16W	R781			RK73GB1J223J	CHIP R	22K	J	1/16W
R551			RK73GB1J331J	CHIP R	330	J	1/16W	R782			RK73GB1J104J	CHIP R	100K	J	1/16W
R553			RK73GB1J101J	CHIP R	100	J	1/16W	R783			RK73GB1J473J	CHIP R	47K	J	1/16W
R554			RK73GB1J470J	CHIP R	47	J	1/16W	R784			RK73GB1J681J	CHIP R	680	J	1/16W
R555			RK73GB1J333J	CHIP R	33K	J	1/16W	R785			RK73GB1J224J	CHIP R	220K	J	1/16W
R556,557			RK73GB1J103J	CHIP R	10K	J	1/16W	R786			RK73GB1J684J	CHIP R	680K	J	1/16W
R558			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R787			R92-1252-05	CHIP R	0 OHM	J	1/16W
R559			RK73GB1J101J	CHIP R	100	J	1/16W	R788			RK73GB1J683J	CHIP R	68K	J	1/16W
R560			RK73GB1J100J	CHIP R	10	J	1/16W	R789			RK73GB1J183J	CHIP R	18K	J	1/16W
R561			RK73GB1J152J	CHIP R	1.5K	J	1/16W	R793			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R562			RK73GB1J331J	CHIP R	330	J	1/16W	R794			RK73GB1J392J	CHIP R	3.9K	J	1/16W
R563			RK73GB1J221J	CHIP R	220	J	1/16W	R795			RK73GB1J124J	CHIP R	120K	J	1/16W
R564			RK73GB1J101J	CHIP R	100	J	1/16W	R797			RK73GB1J563J	CHIP R	56K	J	1/16W
R565			RK73GB1J331J	CHIP R	330	J	1/16W	R798			R92-0670-05	CHIP R	0 OHM		
R566			RK73GB1J330J	CHIP R	33	J	1/16W	R799			RK73GB1J103J	CHIP R	10K	J	1/16W
R567			RK73GB1J222J	CHIP R	2.2K	J	1/16W	R800			RK73GB1J224J	CHIP R	220K	J	1/16W
R568			RK73GB1J104J	CHIP R	100K	J	1/16W	R801,802			RK73GB1J473J	CHIP R	47K	J	1/16W
R569			RK73GB1J103J	CHIP R	10K	J	1/16W	R803			RK73GB1J274J	CHIP R	270K	J	1/16W
R570			RK73GB1J104J	CHIP R	100K	J	1/16W	R804			RK73GB1J104J	CHIP R	100K	J	1/16W
R571			RK73GB1J103J	CHIP R	10K	J	1/16W	R805			RK73GB1J103J	CHIP R	10K	J	1/16W
R572			RK73GB1J272J	CHIP R	2.7K	J	1/16W	R806,807			RK73GB1J473J	CHIP R	47K	J	1/16W
R573			RK73GB1J103J	CHIP R	10K	J	1/16W	R808			RK73GB1J823J	CHIP R	82K	J	1/16W
R700			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R810			RK73GB1J154J	CHIP R	150K	J	1/16W
R701			RK73GB1J473J	CHIP R	47K	J	1/16W	R811,812			RK73GB1J104J	CHIP R	100K	J	1/16W
R702			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R813			RK73GB1J153J	CHIP R	15K	J	1/16W
R703			R92-1252-05	CHIP R	0 OHM	J	1/16W	R814			RK73GB1J103J	CHIP R	10K	J	1/16W
R704			RK73GB1J473J	CHIP R	47K	J	1/16W	R815,816			RK73GB1J473J	CHIP R	47K	J	1/16W
R705,706			RK73GB1J152J	CHIP R	1.5K	J	1/16W	R817,818			RK73GB1J104J	CHIP R	100K	J	1/16W
R707,708			RK73GB1J333J	CHIP R	33K	J	1/16W	R819			RK73GB1J563J	CHIP R	56K	J	1/16W
R709,710			RK73GB1J473J	CHIP R	47K	J	1/16W	R820			RK73GB1J333J	CHIP R	33K	J	1/16W
R711			RK73HB1J101J	CHIP R	100	J	1/16W	R821			RK73GB1J473J	CHIP R	47K	J	1/16W
R713			RK73GB1J473J	CHIP R	47K	J	1/16W	R822			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R715			RK73GB1J473J	CHIP R	47K	J	1/16W	R823			RK73GB1J224J	CHIP R	220K	J	1/16W
R718			RK73GB1J473J	CHIP R	47K	J	1/16W	R824			RK73GB1J153J	CHIP R	15K	J	1/16W
R726,727			RK73GB1J473J	CHIP R	47K	J	1/16W	R825			RK73GB1J473J	CHIP R	47K	J	1/16W
R728-731			R92-1252-05	CHIP R	0 OHM	J	1/16W	R826			RK73GB1J103J	CHIP R	10K	J	1/16W
R749			RK73GB1J473J	CHIP R	47K	J	1/16W	R827			R92-0670-05	CHIP R	0 OHM		
R751			R92-1252-05	CHIP R	0 OHM	J	1/16W	R828			RK73GB1J103J	CHIP R	10K	J	1/16W
R752,753			RK73GB1J473J	CHIP R	47K	J	1/16W	R829			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R754			R92-1252-05	CHIP R	0 OHM	J	1/16W	R831			RK73GB1J104J	CHIP R	100K	J	1/16W
R755,756			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R832			RK73GB1J473J	CHIP R	47K	J	1/16W
R757			RK73GB1J473J	CHIP R	47K	J	1/16W	R834			RK73GB1J103J	CHIP R	10K	J	1/16W
R758			R92-1252-05	CHIP R	0 OHM	J	1/16W	R835			RK73GB1J104J	CHIP R	100K	J	1/16W
R759			RK73GB1J473J	CHIP R	47K	J	1/16W	R836			RK73GB1J393J	CHIP R	39K	J	1/16W
R760			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R837			RK73GB1J274J	CHIP R	270K	J	1/16W
R761			RK73GB1J473J	CHIP R	47K	J	1/16W	R838			RK73GB1J474J	CHIP R	470K	J	1/16W
R762			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R839			RK73GB1J104J	CHIP R	100K	J	1/16W
R763,764			RK73GB1J473J	CHIP R	47K	J	1/16W	R841			RK73GB1J104J	CHIP R	100K	J	1/16W
R765			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R842			R92-1252-05	CHIP R	0 OHM	J	1/16W
R766			RK73GB1J472J	CHIP R	4.7K	J	1/16W	R843-946			RK73GB1J473J	CHIP R	47K	J	1/16W
R767,768			RK73GB1J473J	CHIP R	47K	J	1/16W	R847			RK73GB1J124J	CHIP R	120K	J	1/16W
R769			RK73GB1J101J	CHIP R	100	J	1/16W	R848			RK73GB1J334J	CHIP R	330K	J	1/16W
R770			RK73GB1J473J	CHIP R	47K	J	1/16W	R849			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R771			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R850			RK73GB1J103J	CHIP R	10K	J	1/16W
R772			RK73GB1J473J	CHIP R	47K	J	1/16W	R851,852			R92-1252-05	CHIP R	0 OHM	J	1/16W
R773			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R853			RK73GB1J104J	CHIP R	100K	J	1/16W

PARTS LIST

TX-RX UNIT (X57-6570-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R854			RK73GB1J474J	CHIP R 470K J 1/16W		IC700		*	BU4094BCFV	MOS IC	
R857			RK73GB1J103J	CHIP R 10K J 1/16W		IC701		*	30620M8A-5H1GP	MPU	
R858			RK73GB1J473J	CHIP R 47K J 1/16W		IC702			BU4094BCFV	MOS IC	
R859			RK73GB1J333J	CHIP R 33K J 1/16W		IC703			ADM202EARN	MOS IC	
R861,862			RK73GB1J473J	CHIP R 47K J 1/16W		IC704		*	AT24128N10SI27	ROM IC	
R863			RK73GB1J683J	CHIP R 68K J 1/16W		IC705		*	AT29C040A-12TI	ROM IC	
R864,865			RK73GB1J103J	CHIP R 10K J 1/16W		IC706			TC74LVX4245FS	MOS IC	
R866			R92-0670-05	CHIP R 0 OHM		IC707-709			TC7VWH32FK	MOS IC	
R867,868			R92-1252-05	CHIP R 0 OHM J 1/16W		IC710			320VC5402PGE	MPU	
VR1			R12-6427-05	TRIMMING POT. (47K)		IC711			TC7SU04FU	MOS IC	
VR700			R32-0643-05	SEMI FIXED VARIABLE RESISTOR		IC712			TA75W01FU	MOS IC	
K700		*	S76-0434-05	RELAY		IC713			AK4550VT	MOS IC	
D1			ZSA5A27	ZENER DIODE		IC714			TC75W51FU	MOS IC	
D2			02DZ6.2(Y)	ZENER DIODE		IC715,716			TA75W01FU	MOS IC	
D3			MA4PH633	DIODE		IC717			BU4053BCFV	MOS IC	
D4			XB15A709	DIODE		IC718			M62364FP	MOS IC	
D5,6			MA742	DIODE		IC719			TC75W51FU	MOS IC	
D7			1SS226	DIODE		IC720			TDA8561Q	BI-POLAR IC	
D11			1SS355	DIODE		IC721			LMC7101BIM5	MOS IC	
D101			DSA3A1-FK	DIODE		IC722			TA75S01F	MOS IC	
D102			02DZ18(X,Y)	ZENER DIODE		IC723			NJM78L05UA	BI-POLAR IC	
D103			02DZ15(X,Y)	ZENER DIODE		IC724			TC4W53FU	MOS IC	
D104-106			1SS355	DIODE		IC725			PST9140NR	MOS IC	
D108			DA204U	DIODE		Q1			2SC3356(R24)	TRANSISTOR	
D109		*	02DZ10(Z)	ZENER DIODE		Q2			2SC3357	TRANSISTOR	
D201			1SS355	DIODE		Q4		*	PD55003S	FET	
D202			MA742	DIODE		Q5		*	RD70HVF1-01	FET	
D203-206			DAN235E	DIODE		Q101,102			DTC114EE	DIGITAL TRANSISTOR	
D207-209			1SV228	VARIABLE CAPACITANCE DIODE		Q103			2SJ506(S)	FET	
D501-508			1SV282	VARIABLE CAPACITANCE DIODE		Q104,105			DTC114EE	DIGITAL TRANSISTOR	
D509,510			1SS388	DIODE		Q106,107			2SB1132(Q,R)	TRANSISTOR	
D511			1SV278	VARIABLE CAPACITANCE DIODE		Q108			DTA114EE	DIGITAL TRANSISTOR	
D512		*	02DZ12(Y)	ZENER DIODE		Q109			DTA114YE	DIGITAL TRANSISTOR	
D513,514			HVC131	DIODE		Q110			DTA114YE	DIGITAL TRANSISTOR	
D515			MA2S111	DIODE		Q111			DTA114EE	DIGITAL TRANSISTOR	
D700			1SS355	DIODE		Q112			DTA114YE	DIGITAL TRANSISTOR	
D701-703			DA204U	DIODE		Q113			DTA114YE	DIGITAL TRANSISTOR	
D704			MA2S111	DIODE		Q201			DTA114EE	DIGITAL TRANSISTOR	
D705-709			DA204U	DIODE		Q202,203			2SC4617(S)	DIGITAL TRANSISTOR	
D710			02DZ18(X,Y)	ZENER DIODE		Q204			2SC4617(S)	TRANSISTOR	
D711,712			MA742	DIODE		Q205			DTA144EE	DIGITAL TRANSISTOR	
D714			1SS388	DIODE		Q206			2SC4215(Y)	TRANSISTOR	
D715			02DZ18(X,Y)	ZENER DIODE		Q207,208			2SC3357	TRANSISTOR	
D785-790			02DZ5.1(Y)	ZENER DIODE		Q209-212			2SK508NV(K52)	FET	
D791		*	MINISMDM075/24	VARISTOR		Q213			2SC3357	TRANSISTOR	
D793		*	MINISMDM110/16	VARISTOR							
IC1,2			TA75W01FU	MOS IC		Q501			2SC4416(BL)	TRANSISTOR	
IC101			PST9140NR	MOS IC		Q502			2SK1215(E)	FET	
IC102			TC4013BF(N)	MOS IC		Q503,504			2SC4116(BL)	TRANSISTOR	
IC103			PST9140NR	MOS IC		Q505			2SC4738(GR)	TRANSISTOR	
IC104			TA7808S	MOS IC		Q506			2SA1832(GR)	TRANSISTOR	
IC105			TA7805F	MOS IC		Q507			2SK508NV(K52)	FET	
IC106			XC62FP3302P	MOS IC		Q508			2SC4416(GR)	TRANSISTOR	
IC107			XC62FP1802P	MOS IC		Q509			2SK508NV(K52)	FET	
IC108			XC62FP3302P	MOS IC		Q510-512			2SC4416(GR)	TRANSISTOR	
IC201			TA31136FN	MOS IC		Q513			2SC5108(Y)	TRANSISTOR	
IC202			TC7S66FU	MOS IC		Q514			DTC114EE	DIGITAL TRANSISTOR	
IC501		*	ADF4111BRU	MOS IC		Q515,516			2SC5108(Y)	TRANSISTOR	
						Q517			2SC4416(GR)	TRANSISTOR	
						Q518			2SA1832(GR)	TRANSISTOR	
						Q519			DTC144EE	DIGITAL TRANSISTOR	

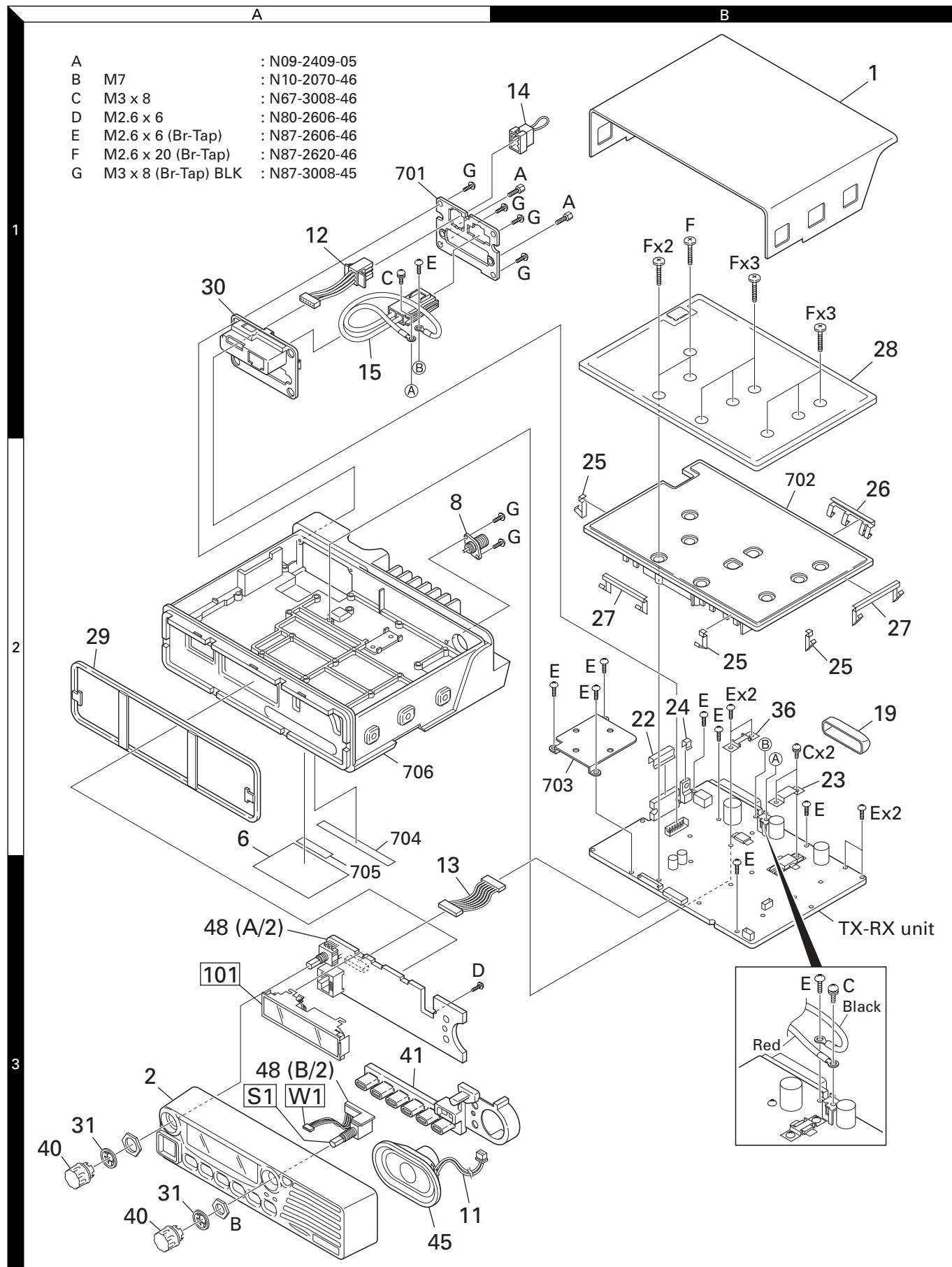
PARTS LIST

TX-RX UNIT (X57-6570-10)

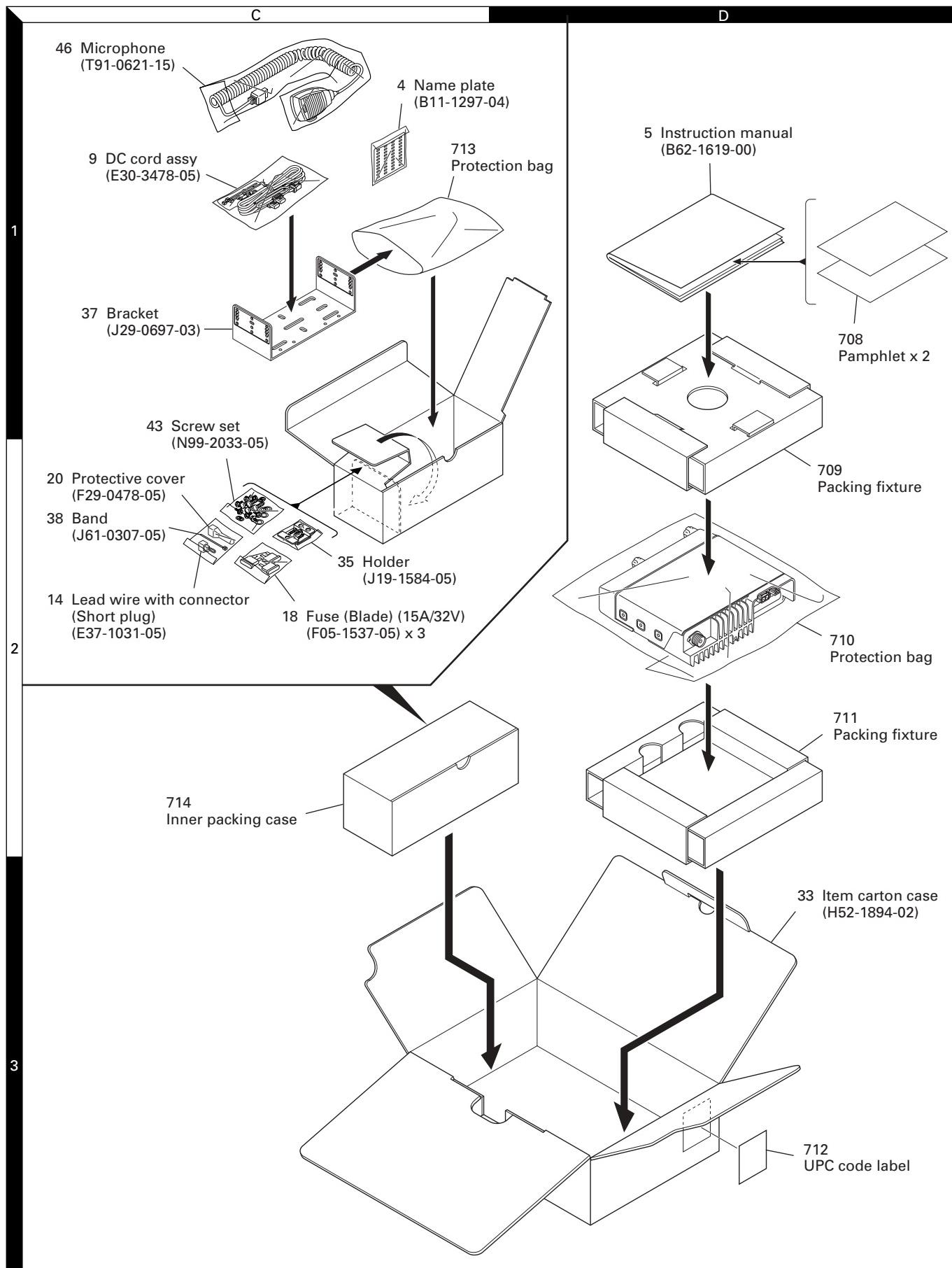
Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
Q520			2SC4116(GR)	TRANSISTOR							
Q521			DTC144EE	DIGITAL TRANSISTOR							
Q700			2SK1824	FET							
Q701			DTC114EE	DIGITAL TRANSISTOR							
Q702			DTC144EE	DIGITAL TRANSISTOR							
Q703-706			DTD114EK	DIGITAL TRANSISTOR							
Q707			2SC4116(Y)	TRANSISTOR							
Q708			2SA1586(Y,GR)	TRANSISTOR							
Q709			DTC144EE	DIGITAL TRANSISTOR							
Q710			DTC114EE	DIGITAL TRANSISTOR							
Q711			2SD1757K	TRANSISTOR							
Q712			2SJ243	FET							
Q713			2SK1824	FET							
Q714			DTC144EE	DIGITAL TRANSISTOR							
Q716			DTC114EE	DIGITAL TRANSISTOR							
Q719,720			DTC114YE	DIGITAL TRANSISTOR							
TH1,2			S1R104J475H	THERMISTOR							
TH201			157-503-53006	THERMISTOR							
TH202			157-104-65001	THERMISTOR							

TK-7150

EXPLODED VIEW



PACKING

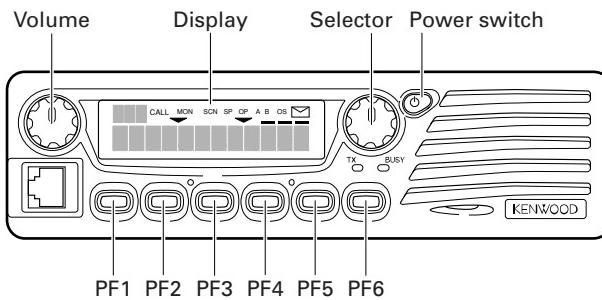


Parts with the exploded numbers larger than 700 are not supplied.

ADJUSTMENT

1. Key Functions

1-1. Front Panel



1-2. Panel Test Mode

■ When the Function is Off (▼ does not appear)

Controls	Function
PF1	Test channel down
PF2	Test channel up
PF3	Test mode/Tuning mode changeover
PF4	Noise squelch off
PF5	Wide/Narrow changeover When the narrow is on, □ appears
PF6	After pressing PF6 key, press PF3, PF4, PF5, and PF6 to activate the following functions (See the table below)
Selector knob	Signalling up/down

■ When the Function is On (▼ appears)

Controls	Function
PF1	No function
PF2	No function
PF3	— appears on the right side When the Sig No.9 (DTMF) is on, DTMF [9] is transmitted. When the Sig No.12 (MSK) is on, the continuous MSK tone is transmitted.
PF4	Compander on (OP icon appears) / off
PF5	Beat shift on (B icon appears) / off
PF6	MSK speed changeover (1200/2400bps). When MSK speed is 2400 bps, the Mail icon appears.
Selector knob	Test signalling up/down

1-3. Panel Tuning mode

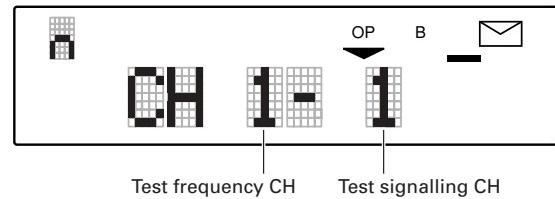
Controls	Function
PF1	Tuning item down
PF2	Tuning item up
PF3	Test mode/Tuning mode changeover
PF4	Noise squelch off
PF5	Wide/Narrow changeover
PF6	Tuning value write→Move to the next tuning item
Selector knob	Tuning value up/down

2. Panel Test Mode

The transceiver's transmission output, receiver sensitivity, and other items are measured and QT, DQT, 2-Tone and DTMF signalling is decoded in this mode.

2-1. To Enter the Panel Test Mode

Hold down [PF1] and turn the power switch on to enter this mode. The test frequency channel and test signalling channel will be displayed.



2-2. Test Frequency Channel (MHz)

CH	RX	TX
1/FC	155.15	155.00
2/FL	136.15	136.00
3/FH	173.85	174.00
4	145.55	145.50
5	164.55	164.50
6	155.00	155.00
7	155.20	155.20
8	155.40	155.40

2-3. Test Signalling Channel

No.	Decode	Encode
1	None	None
2	LTR	LTR
3	QT 67Hz	QT 67Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 254.1Hz	QT 254.1Hz
7	DQT 023N	DQT 023N
8	DQT 754I	DQT 754I
9	DTMF decode (159D)	DTMF encode (159D)
10	2-Tone decode A : 304.7Hz, B : 3106.0Hz	2-Tone encode A : 304.7Hz, B : 3106.0Hz
11	Single tone 979.9Hz	Single tone 979.9Hz
12	MSK	MSK
13	None	Single tone : 1kHz

3. Panel Tuning Mode

The transceiver is adjusted in this mode.

3-1. To Enter the Panel Tuning Mode

Press the [PF3] key in the panel test mode.

The adjustment items, the frequency and signalling, other than the maximum deviation and sensitivity, return to the values that were effective for the test frequency channel and test signalling channel before entering the panel tuning mode.

ADJUSTMENT

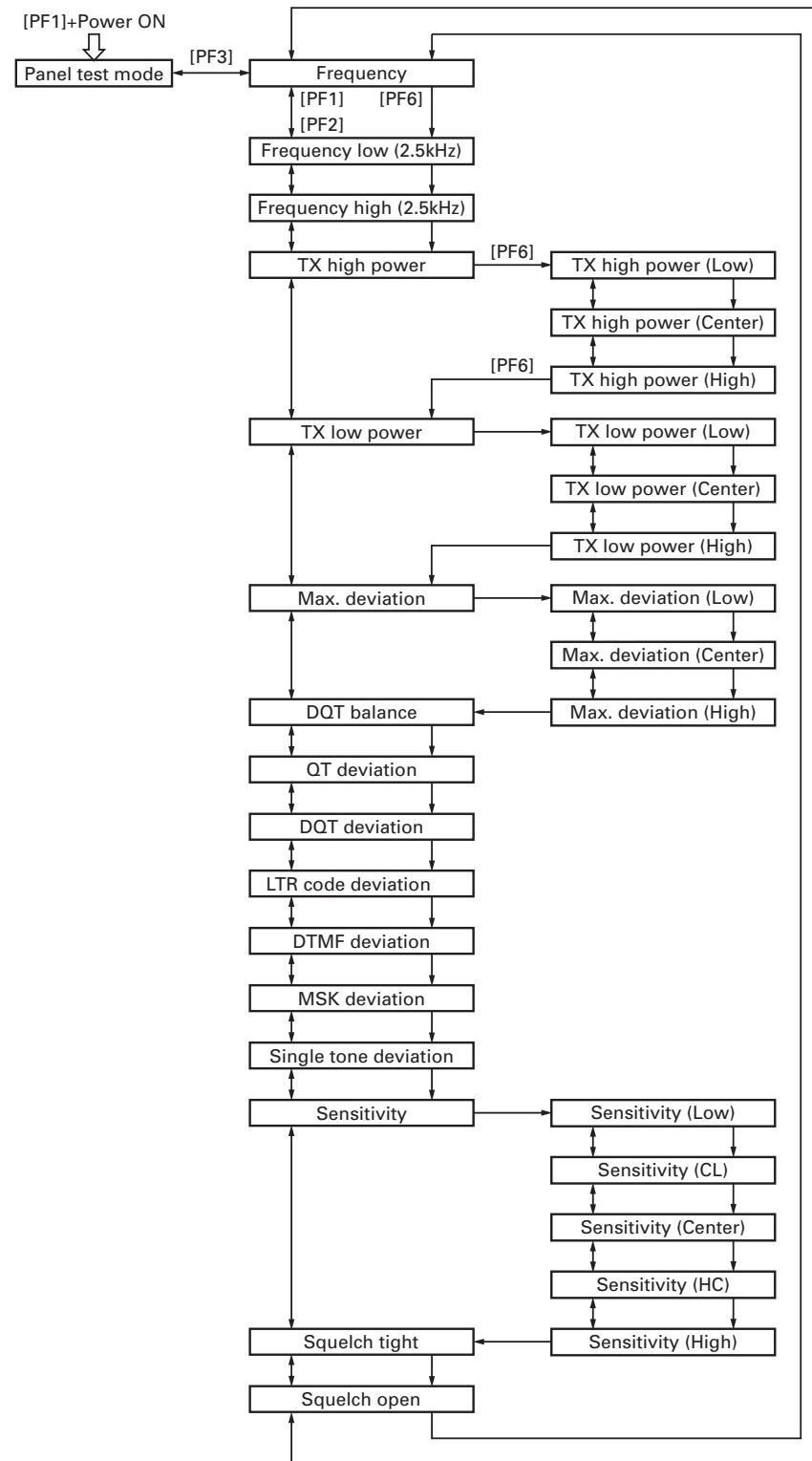
3-2. Tuning Item and Display (** : 1~256)

Tuning item	W/N	LCD display	S-LCD	Signalling
Frequency	-	F r e q _ _ _ _ _ * * *		No signalling
Frequency low (2.5kHz)	-	F r e q _ L O _ _ _ * * *		No signalling
Frequency high (2.5kHz)	-	F r e q _ H I _ _ _ * * *		No signalling
TX high power (Low)	-	H i _ P o w e r _ * * *	_ _ L	No signalling
TX high power (Center)	-	H i _ P o w e r _ * * *	_ _ C	No signalling
TX high power (High)	-	H i _ P o w e r _ * * *	_ _ H	No signalling
TX low power (Low)	-	L o _ P o w e r _ * * *	_ _ L	No signalling
TX low power (Center)	-	L o _ P o w e r _ * * *	_ _ C	No signalling
TX low power (High)	-	L o _ P o w e r _ * * *	_ _ H	No signalling
Max. deviation (Low)	Wide	M a x _ D e v _ _ _ * * *	_ _ L	No signalling
Max. deviation (Center)	Wide	M a x _ D e v _ _ _ * * *	_ _ C	No signalling
Max. deviation (High)	Wide	M a x _ D e v _ _ _ * * *	_ _ H	No signalling
Max. deviation (Low)	Narrow	M a x _ D e v _ _ _ * * *	n _ L	No signalling
Max. deviation (Center)	Narrow	M a x _ D e v _ _ _ * * *	n _ C	No signalling
Max. deviation (High)	Narrow	M a x _ D e v _ _ _ * * *	n _ H	No signalling
DQT balance	Wide	D Q T _ B a l _ _ _ * * *		Square waveform 100Hz
DQT balance	Narrow	D Q T _ B a l _ _ _ * * *	n _ _	Square waveform 100Hz
QT deviation	Wide	Q T _ D e v _ _ _ * * *		QT : 67.0Hz
QT deviation	Narrow	Q T _ D e v _ _ _ * * *	n _ _	QT : 67.0Hz
DQT deviation	Wide	D Q T _ D e v _ _ _ * * *		DQT : 023N
DQT deviation	Narrow	D Q T _ D e v _ _ _ * * *	n _ _	DQT : 023N
LTR code deviation	Wide	L T R _ D e v _ _ _ * * *		LTR data : Area=0, Goto=12, Home=12, ID=47, Free=25
LTR code deviation	Narrow	L T R _ D e v _ _ _ * * *	n _ _	LTR data : Area=0, Goto=12, Home=12, ID=47, Free=25
DTMF deviation	Wide	D T M F _ D e v _ _ _ * * *		DTMF : 9
DTMF deviation	Narrow	D T M F _ D e v _ _ _ * * *	n _ _	DTMF : 9
MSK deviation	Wide	M S K _ D e v _ _ _ * * *		0xAAA...
MSK deviation	Narrow	M S K _ D e v _ _ _ * * *	n _ _	0xAAA...
Single tone deviation	Wide	T o n e _ D e v _ _ _ * * *		1000Hz
Single tone deviation	Narrow	T o n e _ D e v _ _ _ * * *	n _ _	1000Hz
Sensitivity	-	S e n s _ _ _ _ _ * * *	_ _ L	No signalling, Squelch off
Sensitivity	-	S e n s _ _ _ _ _ * * *	_ _ C L	No signalling, Squelch off
Sensitivity	-	S e n s _ _ _ _ _ * * *	_ _ C	No signalling, Squelch off
Sensitivity	-	S e n s _ _ _ _ _ * * *	_ _ H C	No signalling, Squelch off
Sensitivity	-	S e n s _ _ _ _ _ * * *	_ _ H	No signalling, Squelch off
Squelch tight	Wide	S q u e l c h _ T _ _ _ _ _ * * *		No signalling
Squelch tight	Narrow	S q u e l c h _ T _ _ _ _ _ * * *	n _ _	No signalling
Squelch open	Wide	S q u e l c h _ O _ _ _ _ _ * * *		No signalling
Squelch open	Narrow	S q u e l c h _ O _ _ _ _ _ * * *	n _ _	No signalling

ADJUSTMENT

3-3. Flow Chart

1. ↔ : Use the [PF1] and [PF2] keys.
2. → : Use the [PF6] key.
3. Use the [SELECTOR] knob to set an adjustment value (1 to 256) for each adjustment item.
4. Use the [PF6] key to move to the next item.

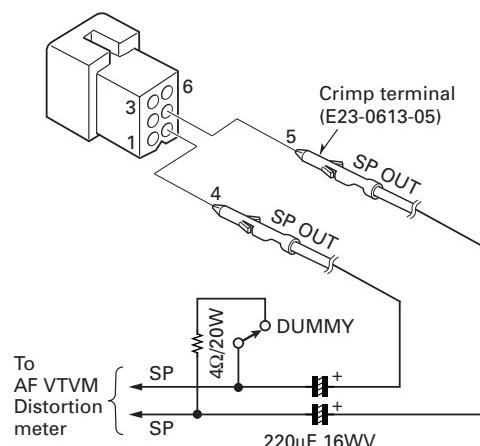


ADJUSTMENT

4. Test Equipment Required for Alignment

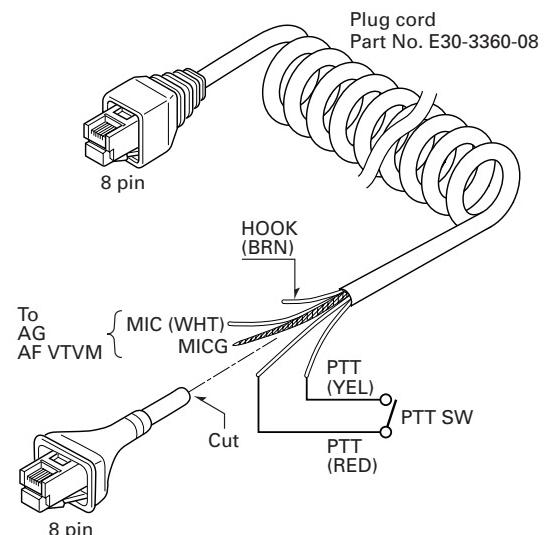
Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range	136 to 174MHz
	Modulation	Frequency modulation and external modulation
	Output	0.1μV to greater than 1mV
2. Power Meter	Input Impedance	50Ω
	Operation Frequency	136 to 174MHz or more
	Measurement Capability	Vicinity of 50W
3. Deviation Meter	Frequency Range	136 to 174MHz
4. Digital Volt Meter (DVM)	Measuring Range	1 to 20V DC
	Accuracy	High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range	10Hz to 600MHz
	Frequency Stability	0.2ppm or less
7. Ammeter		13A or more
8. AF Volt Meter (AF VTVM)	Frequency Range	50Hz to 10kHz
	Voltage Range	3mV to 3V
9. Audio Generator (AG)	Frequency Range	50Hz to 5kHz
	Output	0 to 1V
10. Distortion Meter	Capability	3% or less at 1kHz
	Input Level	50mV to 10Vrms
11. Voltmeter	Measuring Range	10 to 1.5V DC or less
	Input Impedance	50kΩ/V or greater
12. 4Ω Dummy Load		Approx. 4Ω, 20W
13. Regulated Power Supply		13.6V, approx. 20A (adjustable from 9 to 20V) Useful if ammeter required

4-1. Test Cable for Speaker Output



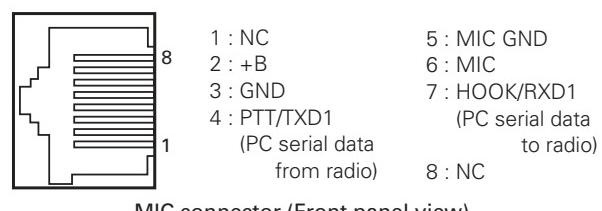
4-3. Test Cable for Microphone Input

The following test cable are recommended.



4-2. Repair Jig (Chassis)

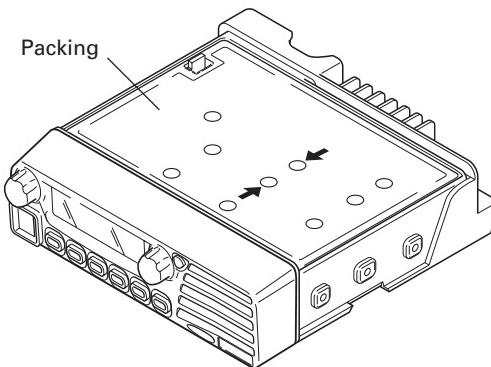
To check the voltage on the foil side of the TX-RX unit or to adjust the PLL lock voltage, use the Repair jig (Part No. A10-4065-02).



ADJUSTMENT

5. Warnings When Removing or Installing the Shielding Cover

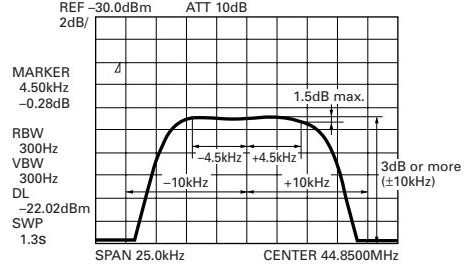
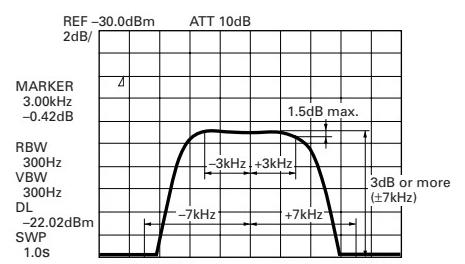
- When handling with the shielding cover, do not damage the components on the TX-RX unit.
- When installing the shielding cover, insert the cover from the rear side.
- When removing the shielding cover, squeeze the hole marked with an arrow as shown on the diagram and pull it straight up.



6. Common Section

Item	Condition	Measurement			Adjustment		Specifications/Remarks																																																																						
		Test-equipment	Unit	Terminal	Unit	Parts																																																																							
1. Frequency list	<ul style="list-style-type: none"> Frequency range (MHz) K : 136~174 	<ul style="list-style-type: none"> Adjustment frequency (MHz) <table border="1"> <thead> <tr> <th>CH</th> <th>RX</th> <th>TX</th> </tr> </thead> <tbody> <tr><td>1/FC</td><td>155.15</td><td>155.00</td></tr> <tr><td>2/FL</td><td>136.15</td><td>136.00</td></tr> <tr><td>3/FH</td><td>173.85</td><td>174.00</td></tr> <tr><td>4</td><td>145.55</td><td>145.50</td></tr> <tr><td>5</td><td>164.55</td><td>164.50</td></tr> <tr><td>6</td><td>155.00</td><td>155.00</td></tr> <tr><td>7</td><td>155.20</td><td>155.20</td></tr> <tr><td>8</td><td>155.40</td><td>155.40</td></tr> </tbody> </table>			CH	RX		TX	1/FC	155.15	155.00	2/FL	136.15	136.00	3/FH	173.85	174.00	4	145.55	145.50	5	164.55	164.50	6	155.00	155.00	7	155.20	155.20	8	155.40	155.40	<ul style="list-style-type: none"> Signalling <table border="1"> <thead> <tr> <th>No.</th> <th>Decode</th> <th>Encode</th> </tr> </thead> <tbody> <tr><td>1</td><td>None</td><td>None</td></tr> <tr><td>2</td><td>LTR</td><td>LTR</td></tr> <tr><td>3</td><td>QT 67Hz</td><td>QT 67Hz</td></tr> <tr><td>4</td><td>QT 151.4Hz</td><td>QT 151.4Hz</td></tr> <tr><td>5</td><td>QT 210.7Hz</td><td>QT 210.7Hz</td></tr> <tr><td>6</td><td>QT 254.1Hz</td><td>QT 254.1Hz</td></tr> <tr><td>7</td><td>DQT 023N</td><td>DQT 023N</td></tr> <tr><td>8</td><td>DQT 754I</td><td>DQT 754I</td></tr> <tr><td>9</td><td>DTMF decode (159D)</td><td>DTMF encode (159D)</td></tr> <tr><td>10</td><td>2-Tone decode A : 304.7Hz, B : 3106.0Hz</td><td>2-Tone encode A : 304.7Hz, B : 3106.0Hz</td></tr> <tr><td>11</td><td>Single tone 979.9Hz</td><td>Single tone 979.9Hz</td></tr> <tr><td>12</td><td>MSK</td><td>MSK</td></tr> <tr><td>13</td><td>None</td><td>Single tone : 1kHz</td></tr> </tbody> </table>				No.	Decode	Encode	1	None	None	2	LTR	LTR	3	QT 67Hz	QT 67Hz	4	QT 151.4Hz	QT 151.4Hz	5	QT 210.7Hz	QT 210.7Hz	6	QT 254.1Hz	QT 254.1Hz	7	DQT 023N	DQT 023N	8	DQT 754I	DQT 754I	9	DTMF decode (159D)	DTMF encode (159D)	10	2-Tone decode A : 304.7Hz, B : 3106.0Hz	2-Tone encode A : 304.7Hz, B : 3106.0Hz	11	Single tone 979.9Hz	Single tone 979.9Hz	12	MSK	MSK	13	None
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12	MSK	MSK																																																																											
13	None	Single tone : 1kHz																																																																											
2. Setting	<ul style="list-style-type: none"> Receiver section The indicated SSG output level are for maximum output. Whenever there is no modulation designation, standard modulation (MOD : 1kHz, DEV : 3kHz (Wide), DEV : 1.5kHz (Narrow)) is indicated. 	<ul style="list-style-type: none"> Transmitter section 																																																																											
		<p>When adjusting the PLL lock voltage, you must set the TX POWER value to 0.</p>			<p>If you transmit without connecting a 50Ω terminator on the antenna connector, the FET final transistor may be damaged.</p>																																																																								

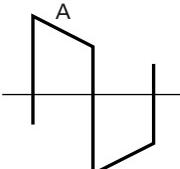
ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. PLL lock voltage	1) CH-SIG : 3-1	DC VM Power meter	TX-RX	CV	TX-RX	TC502	8.2V	$\pm 0.1V$
	2) CH-SIG : 3-1 PTT : ON					TC501		
	3) CH-SIG : 2-1					Check	1.8V or more	
	4) CH-SIG : 2-1 PTT : ON						2.0V or more	
4. Transmit frequency	1) CH-SIG : 1-1 Select Freq_ _ _ _ _ *** in tuning mode PTT : ON	Power meter f. counter	Rear panel	ANT	Front panel	Selector knob	CH-1 frequency	$\pm 50Hz$
5. Transmit frequency (tune)	1) Select Freq_LO_ _ *** Frequency : 136.00250MHz PTT : ON						136.00250MHz	$\pm 50Hz$
	2) Select Freq_HI_ _ *** Frequency : 173.99750MHz PTT : ON						173.99750MHz	$\pm 50Hz$
6. MCF • Wide	1) CH-SIG : 1-1 Spectrum analyzer Span : 25kHz Scale : 2dB div Center frequency : 44.850MHz Tracking generator Output : -30dBm	Spectrum analyzer Tracking generator	TX-RX	CN201	TX-RX	L205 L207 L209	Adjust it to make gain maximum, and make the band flat as shown in the below.	
	1) [PF5] key : Set the narrow "n_ _" appear on the LCD					L206 L208 L210		
• Narrow	1) [PF5] key : Set the narrow "n_ _" appear on the LCD						Adjust it to make gain maximum, and make the band flat as shown in the below.	
7. AF coil adjustment	1) CH-SIG : 1-1 SSG output : -20dBm (FM) frequency : 44.85MHz DEV : 1.5kHz MOD : 1kHz SSG signal inject to CN201.	SSG AF VTV 4Ω dummy load	TX-RX	CN201	TX-RX	L201	Maximum audio output level.	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. TX high power	1) CH-SIG : 3-1 Select __H Hi_Power_*** in tuning mode PTT : ON Keep data at 256	Power meter Ammeter	Rear panel	ANT	TX-RX	VR1	53W	53.0W±0.5W
	2) CH-SIG : 2-1 Select __L Hi_Powe_*** in tuning mode PTT : ON							50.0W±1W 11A or less
	3) CH-SIG : 1-1 Select __C Hi_Powe_*** in tuning mode PTT : ON							
	4) CH-SIG : 3-1 Select __H Hi_Powe_*** in tuning mode PTT : ON							
9. TX low power	1) CH-SIG : 2-1 Select __L Lo_Power_*** in tuning mode PTT : ON					Front panel	Selector knob	15W
	2) CH-SIG : 1-1 Select __C Lo_Power_*** in tuning mode PTT : ON							
	3) CH-SIG : 3-1 Select __H Lo_Power_*** in tuning mode PTT : ON							
10. Maximum deviation • Wide	1) CH-SIG : 2-1 Select __L Max_Dev_*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF AG : 1kHz/50mV	Power meter Deviation meter AF VTVM AG Oscilloscope	Rear panel Front panel	ANT MIC	Front panel	Selector knob	±3.8kHz	±0.1kHz
	2) CH-SIG : 1-1 Select __C Max_Dev_*** in tuning mode PTT : ON							
	3) CH-SIG : 3-1 Select __H Max_Dev_*** in tuning mode PTT : ON							

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
• Narrow	4) CH-SIG : 2-1 [PF5] key : Set the narrow n_L Max_Dev_ _*** in tuning mode PTT : ON	Power meter Deviation meter AF VTVM AG Oscilloscope	Rear panel Front panel	ANT MIC	Front panel	Selector knob	$\pm 1.75\text{kHz}$	$\pm 0.05\text{kHz}$
	5) CH-SIG : 1-1 Select n_C Max_Dev_ _*** in tuning mode PTT : ON							
	6) CH-SIG : 3-1 Select n_H Max_Dev_ _*** in tuning mode PTT : ON							
11. MIC seisitivity (Wide only)	1) CH-SIG : 1-1 PTT : ON Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF AG : 1kHz/5mV	TX-RX	VR700	Check			$2.2\sim 3.7\text{kHz}$	
12. DQT balance • Wide	1) CH-SIG : 1-1 Select DQT_Bal_ _*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF							
	2) [PF5] key : Set the narrow n_ _ DQT_Bal_ _*** in tuning mode PTT : ON							Flat the A parts. 
13. QT deviation • Wide	1) CH-SIG : 1-3 Select QT_Dev_ _ _*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF						$\pm 0.75\text{kHz}$	$\pm 0.05\text{kHz}$
	2) [PF5] key : Set the narrow n_ _ QT_Dev_ _ _*** in tuning mode PTT : ON							
• Narrow							$\pm 0.35\text{kHz}$	$\pm 0.05\text{kHz}$

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ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
14. DQT deviation • Wide	1) CH-SIG : 1-7 Select DQT_Dev_*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF	Power meter Deviation meter AF VTVM AG Oscilloscope	Rear panel Front panel	ANT MIC	Front panel	Selector knob	±0.75kHz	±0.05kHz
	2) [PF5] key : Set the narrow n_— DQT_Dev_*** in tuning mode PTT : ON						±0.35kHz	±0.05kHz
15. LTR code deviation • Wide	1) CH-SIG : 1-2 Select LTR_Dev_*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF						1.00kHz	±0.05kHz
	2) [PF5] key : Set the narrow n_— LTR_Dev_*** in tuning mode PTT : ON						0.75kHz	±0.05kHz
16. DTMF deviation • Wide	1) CH-SIG : 1-9 Select DTMF_Dev_*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF						±3.0kHz	±0.1kHz
	2) [PF5] key : Set the narrow n_— DTMF_Dev_*** in tuning mode PTT : ON						±1.5kHz	±0.1kHz
17. MSK deviation • Wide	1) CH-SIG : 1-12 Select MSK_Dev_*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF						±3.0kHz	±0.1kHz
	2) [PF5] key : Set the narrow n_— MSK_Dev_*** in tuning mode PTT : ON						±1.5kHz	±0.05kHz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
18. Single tone deviation • Wide	1) CH-SIG : 1-11 Select Tone_Dev_*** in tuning mode PTT : ON Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF	Power meter Deviation meter AF VTVM AG Oscilloscope	Rear panel Front panel	ANT MIC	Front panel	Selector knob	±3.0kHz	±0.1kHz
	2) [PF5] key : Set the narrow n_ _ Tone_Dev_*** in tuning mode PTT : ON						±1.5kHz	
19. Sensitivity	1) CH-SIG : 2-1 Select _L Sens_ _ _ _ *** in tuning mode SSG output : -117dBm/0.32μV AF output : 2V/4Ω	SSG AF VTVM Distortion meter Oscilloscope 4Ω dummy load	Rear panel EXT.SP	ANT EXT.SP	Front panel	Selector knob	Adjust for maximum SINAD.	SINAD 12dB or more
	2) CH-SIG : 4-1 Select _CL Sens_ _ _ _ *** in tuning mode							
	3) CH-SIG : 1-1 Select _C Sens_ _ _ _ *** in tuning mode							
	4) CH-SIG : 5-1 Select _HC Sens_ _ _ _ *** in tuning mode							
	5) CH-SIG : 3-1 Select _H Sens_ _ _ _ *** in tuning mode							
20. Squelch tight • Wide	1) CH-SIG : 1-1 Select Sql_T_ _ _ _ *** in tuning mode SSG output : Value when 6dB is added from the sensitivity value of 12dB SINAD.						Adjust to point of opening squelch	Set the value to 255. Adjust the SSG output to "Condition". Then, decrease the value to the point of opening the squelch.
	2) [PF5] key : Set the narrow n_ _ Sql_T_ _ _ _ *** in tuning mode							

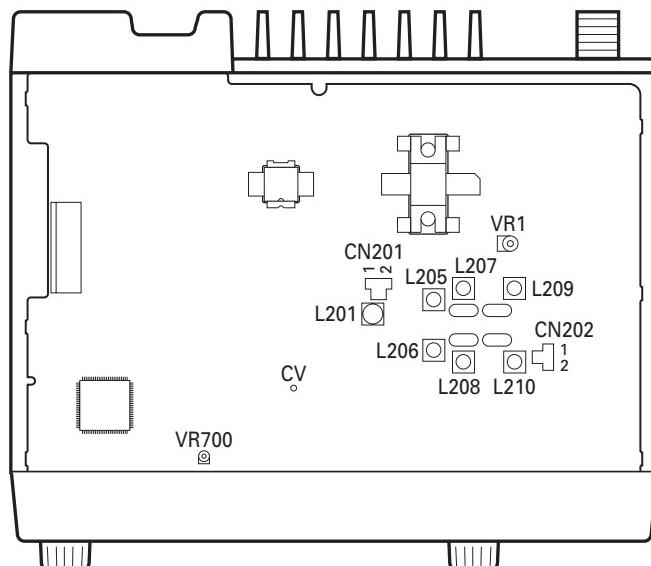
ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test- equipment	Unit	Terminal	Unit	Parts	Method	
21. Squelch open • Wide	1) CH-SIG : 1-1 Select $\text{Sql}_O_{___}$ *** in tuning mode SSG output : Value when 3dB is subtracted from the sensitivity value of 12dB SINAD.	SSG AF VTVM Distortion meter Oscilloscope 4Ω dummy load	Rear panel	ANT EXT.SP	Front panel	Selector knob	Adjust to point of opening squelch	Set the value to 255. Adjust the SSG out- put to "Condition". Then, decrease the value to the point of opening the squelch.
	2) [PF5] key : Set the narrow $n_{_}$ $\text{Sql}_O_{___}$ *** in tuning mode SSG output : Value when 4dB is subtracted from the sensitivity value of 12dB SINAD.							
	3) SSG output : OFF							
• Wide/Narrow							Check	Squelch must be closed.

Note : When you change the Squelch adjustment value, connect all necessary measuring equipment (as stated in the adjustment procedure), then adjust it to the SSG output value.

7. Adjustment Points

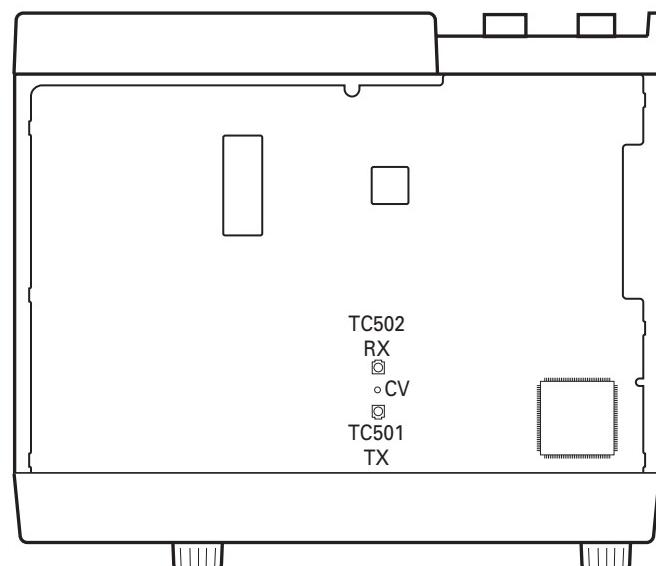
7-1. Component Side View



VR1 : TX high power (High)
VR700 : MIC sensitivity

L201 : AF coil adjustment
L205,207,209 : MCF (Wide)
L206,208,210 : MCF (Narrow)

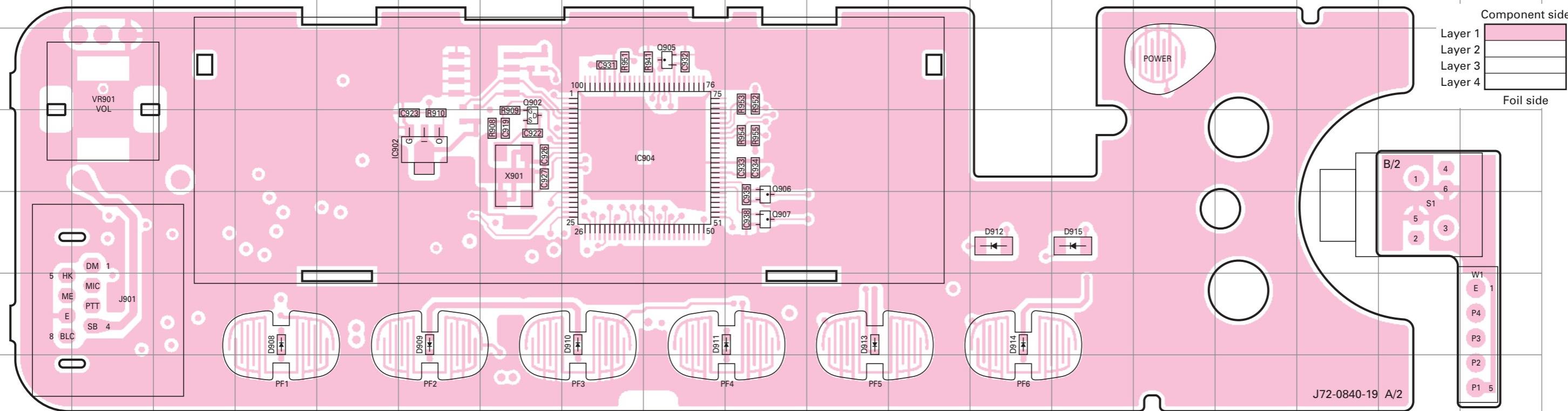
7-2. Foil Side View



TC501 : PLL lock voltage (TX)
TC502 : PLL lock voltage (RX)

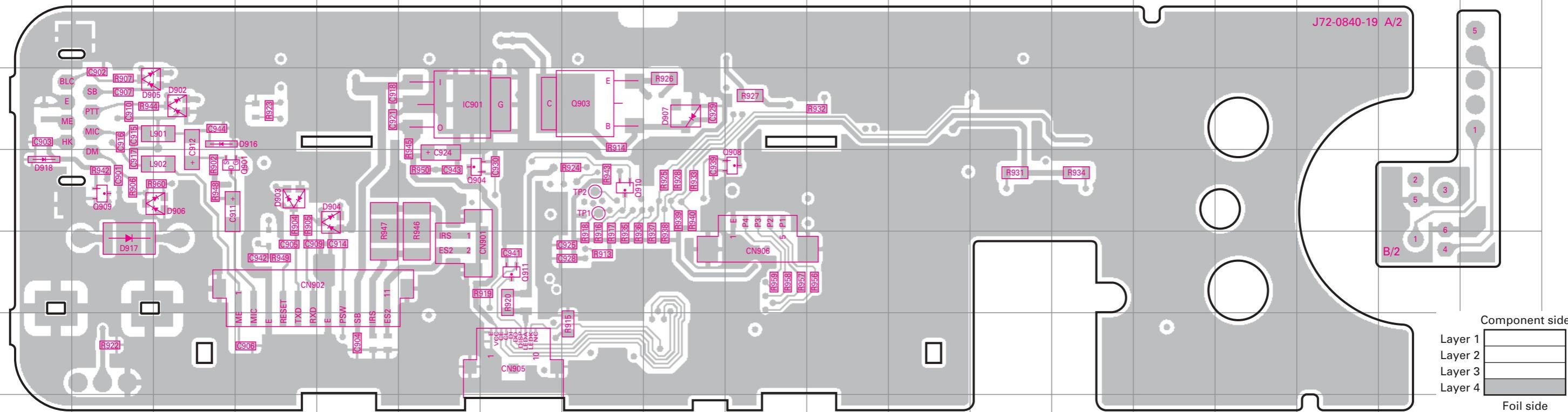
TK-7150 PC BOARD

DISPLAY UNIT (X54-3400-10) Component side view (J72-0840-19)



Ref. No.	Address						
IC902	3F	Q906	4J	D910	5H	D914	5M
IC904	3I	Q907	4J	D911	5J	D915	4N
Q902	3G	D908	5D	D912	4M		
Q905	2I	D909	5F	D913	5K		

DISPLAY UNIT (X54-3400-10) Foil side view (J72-0840-19)

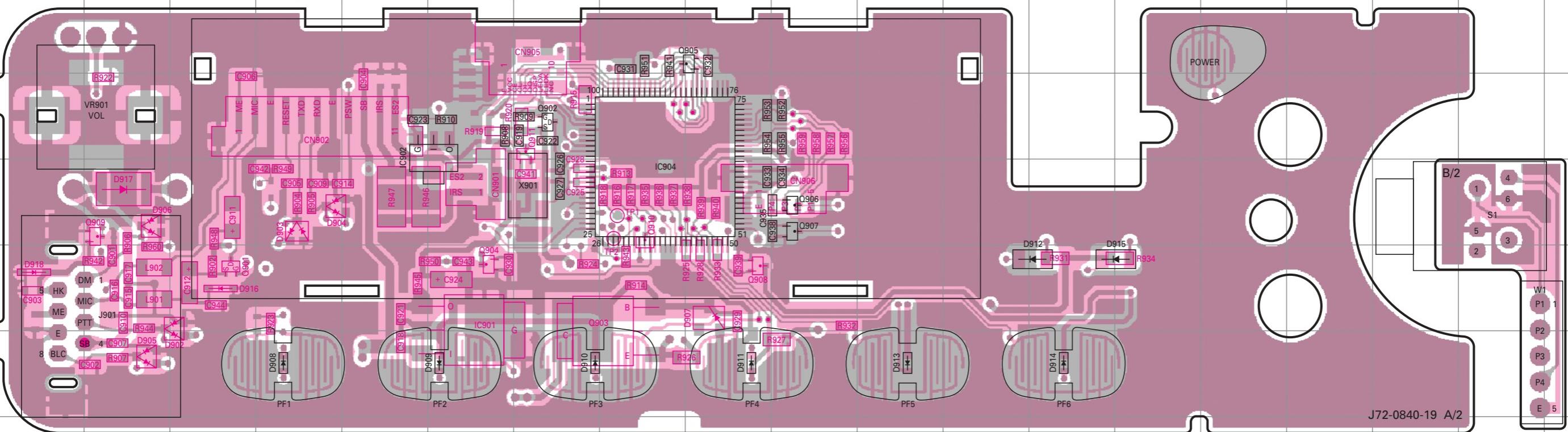


Ref. No.	Address								
IC901	9F	Q908	10J	D902	9C	D906	10C	D918	10A
Q901	10C	Q909	10B	D903	10D	D907	9I		
Q903	9H	Q910	10H	D904	10E	D916	9C		
Q904	10F	Q911	11G	D905	9B	D917	11B		

A B C D E F G H I J K L M N O P Q R S

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DISPLAY UNIT (X54-3400-10) Component side view + Foil side (J72-0840-19)



Ref. No.	Address						
IC901	5F	Q906	4J	D904	4D	D912	5M
IC902	3F	Q907	4J	D905	6B	D913	6K
IC904	4H	Q908	5I	D906	4B	D914	6M
Q901	5C	Q909	4B	D907	5I	D915	5N
Q902	3G	Q910	4H	D908	6D	D916	5C
Q903	5H	Q911	3G	D909	6F	D917	4B
Q904	5F	D902	5C	D910	6G	D918	5A
Q905	2I	D903	4D	D911	6I		

Component side

Layer 1

Layer 2

Layer 3

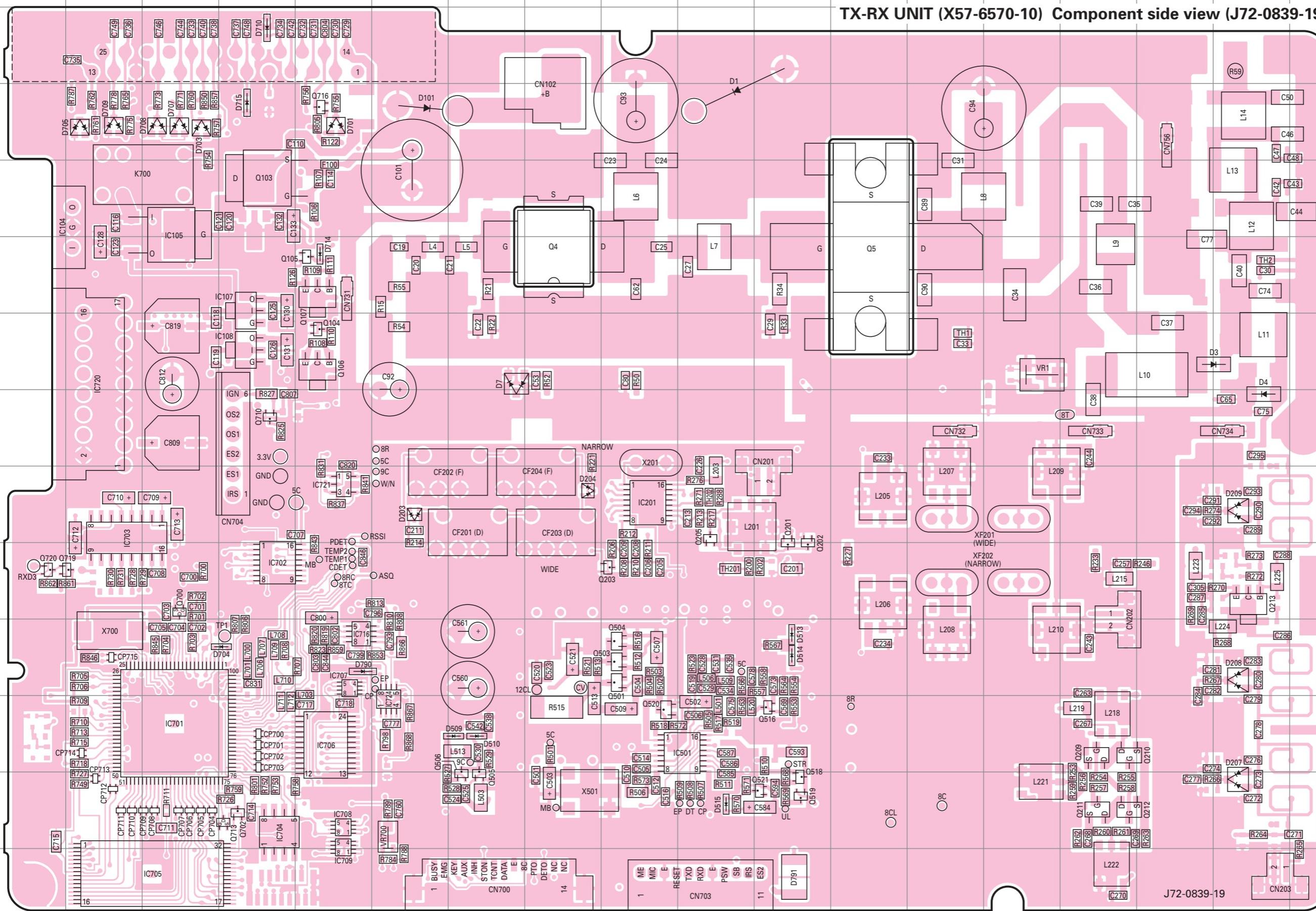
Layer 4

Foil side

● Connect 1 and 4

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TX-RX UNIT (X57-6570-10) Component side view (J72-0839-19)



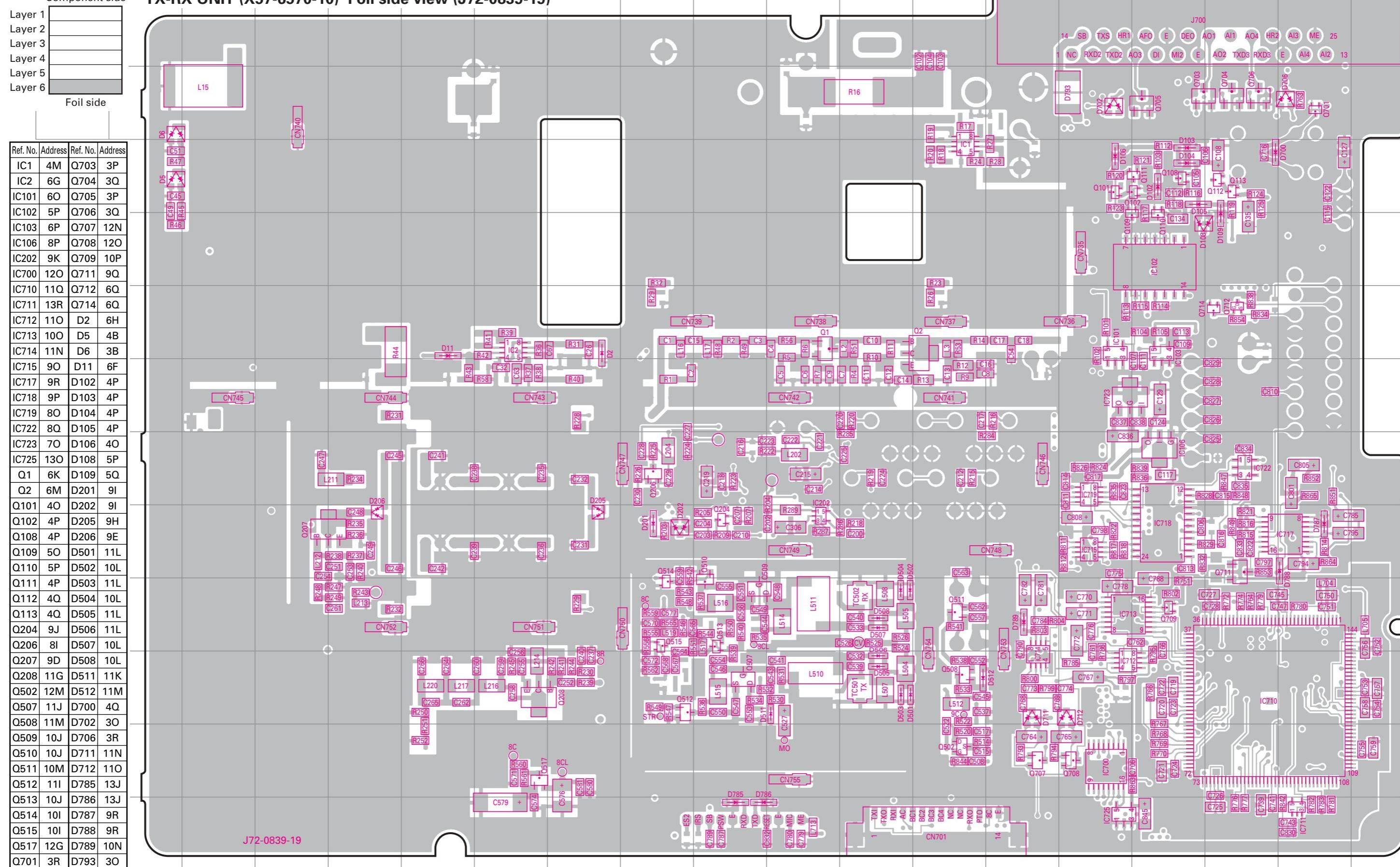
Component side

- Layer 1
- Layer 2
- Layer 3
- Layer 4
- Layer 5
- Layer 6

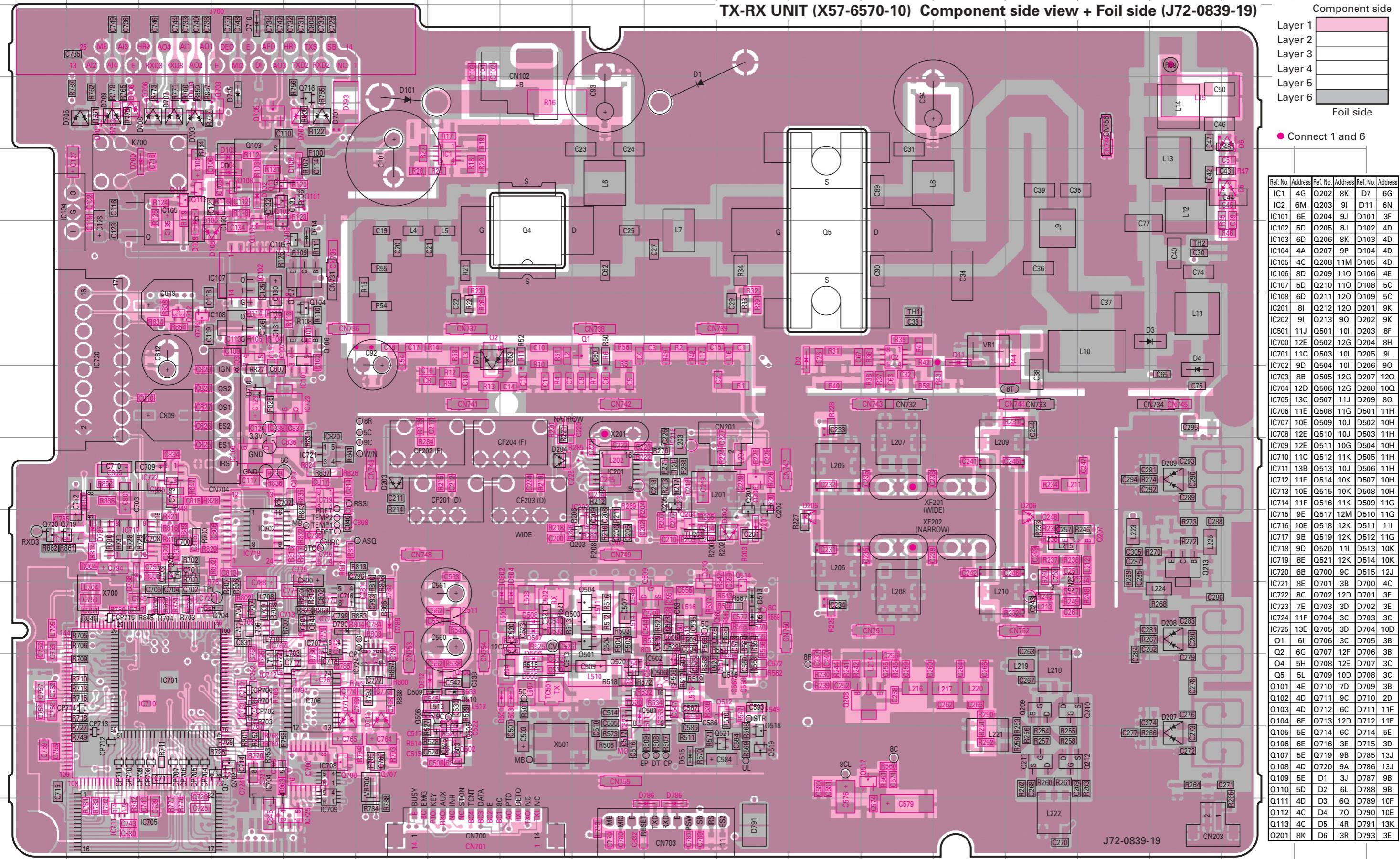
Foil side

Ref. No.	Address	Ref. No.	Address
IC104	4A	Q516	11K
IC105	4C	Q518	12K
IC107	5D	Q519	12K
IC108	6D	Q520	11I
IC201	8I	Q521	12K
IC501	11J	Q700	9C
IC701	11C	Q702	12D
IC702	9D	Q710	7D
IC703	8B	Q713	12D
IC704	12D	Q716	3E
IC705	13C	Q719	9B
IC706	11E	Q720	9A
IC707	10E	D1	3J
IC708	12E	D3	6Q
IC709	12E	D4	7Q
IC716	10E	D7	6G
IC720	6B	D101	3F
IC721	8E	D203	8F
IC724	11F	D204	8H
Q4	5H	D207	12Q
Q5	5L	D208	10Q
Q103	4D	D209	8Q
Q104	6E	D509	11G
Q105	5E	D510	11G
Q106	6E	D513	10K
Q107	5E	D514	10K
Q201	8K	D515	12J
Q202	8K	D701	3E
Q203	9I	D703	3C
Q205	8J	D704	10D
Q209	11O	D705	3B
Q210	11O	D707	3C
Q211	12O	D708	3C
Q212	12O	D709	3B
Q213	9Q	D710	2D
Q501	10I	D714	5E
Q503	10I	D715	3D
Q504	10I	D790	10E
Q505	12G	D791	13K
Q506	12G		

TX-RX UNIT (X57-6570-10) Foil side view (J72-0839-19)

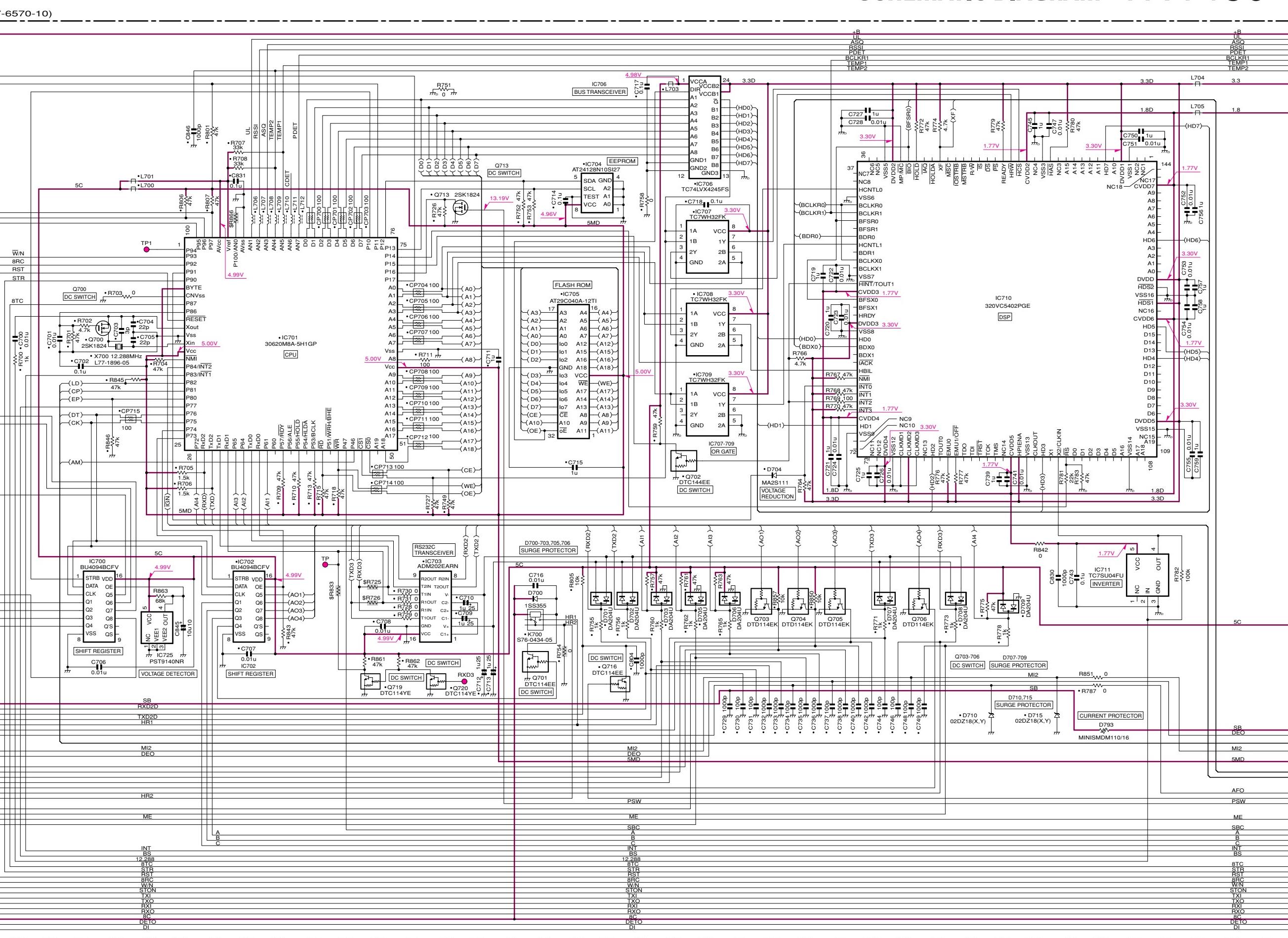
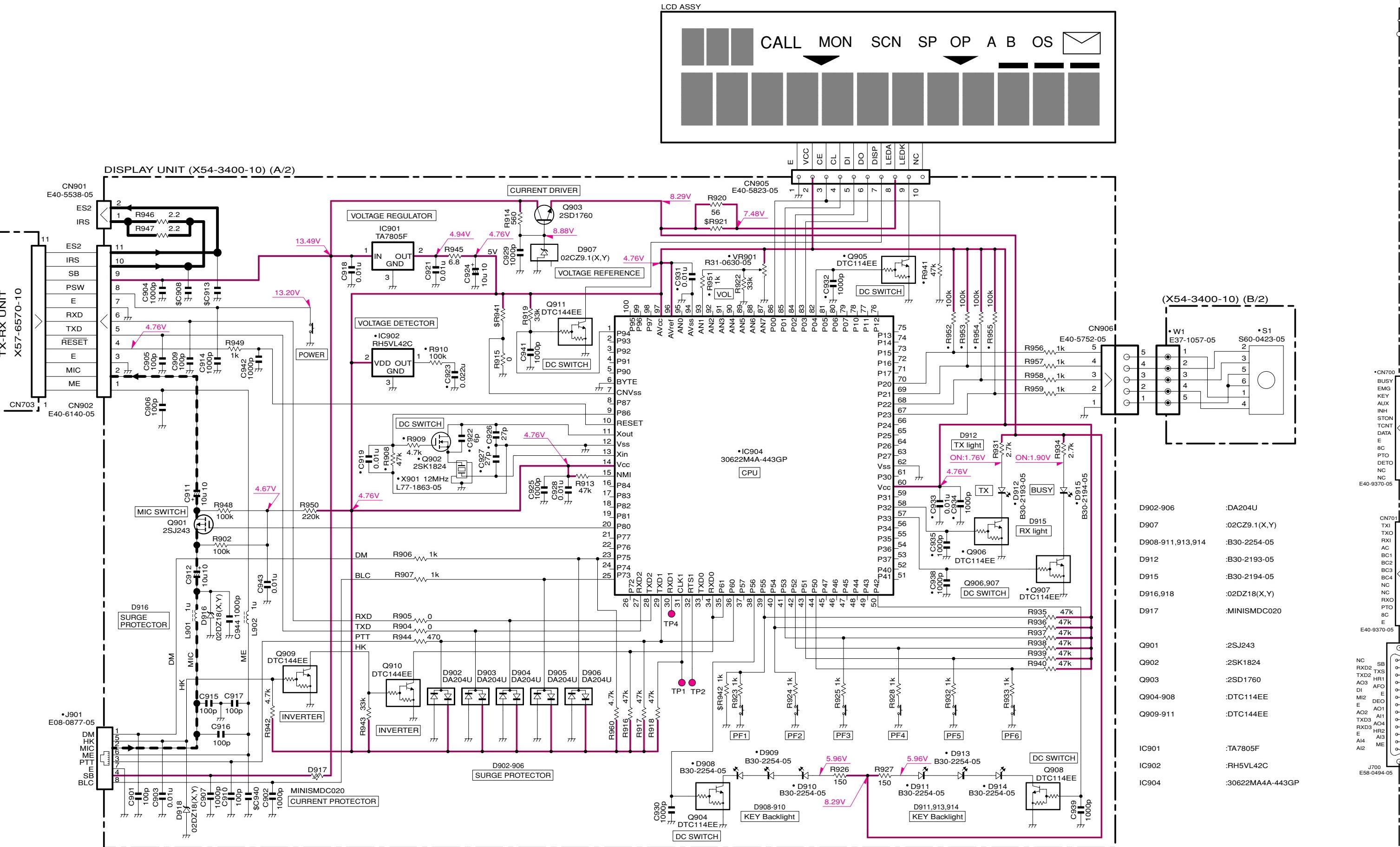


TK-7150 PC BOARD



SCHEMATIC DIAGRAM TK-7150

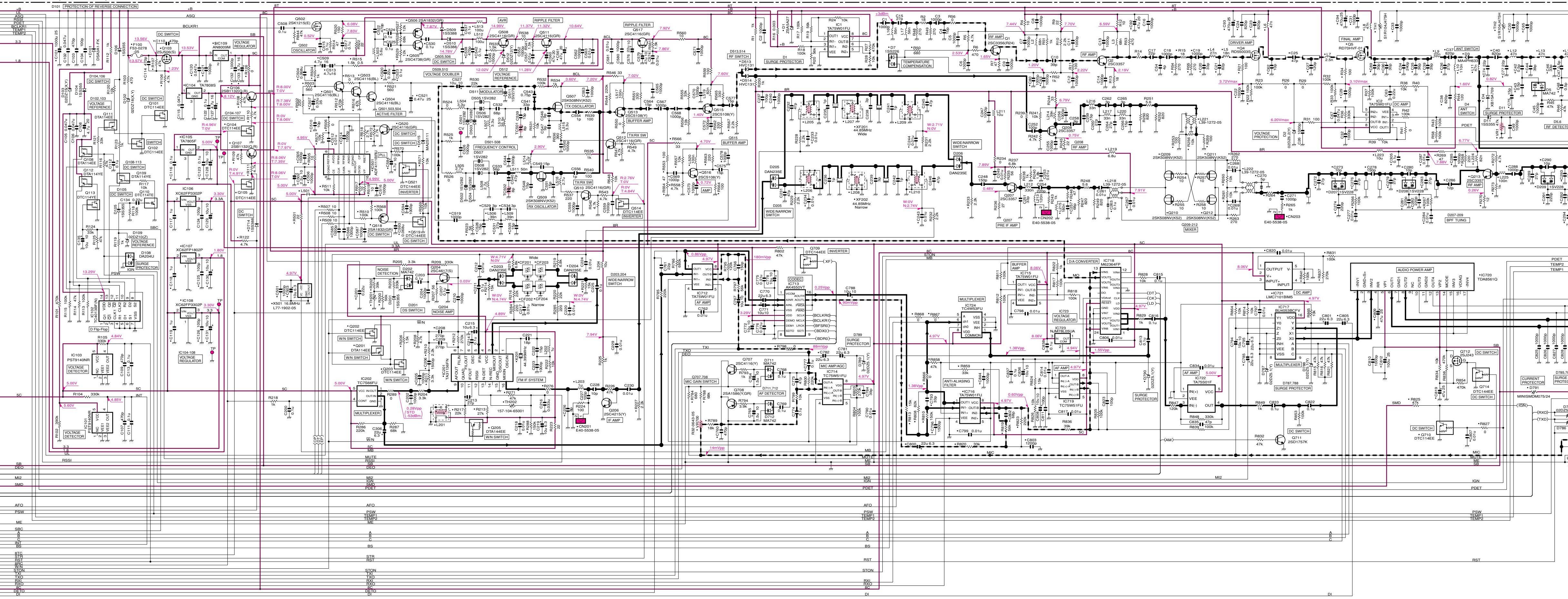
Note : Components marked with a dot (•) are parts of layer 1.



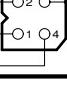
K-7150 SCHEMATIC DIAGRAM

TX-RX UNIT (X5Z-6570-10)

TX-RX UNIT (X57-6570-10)

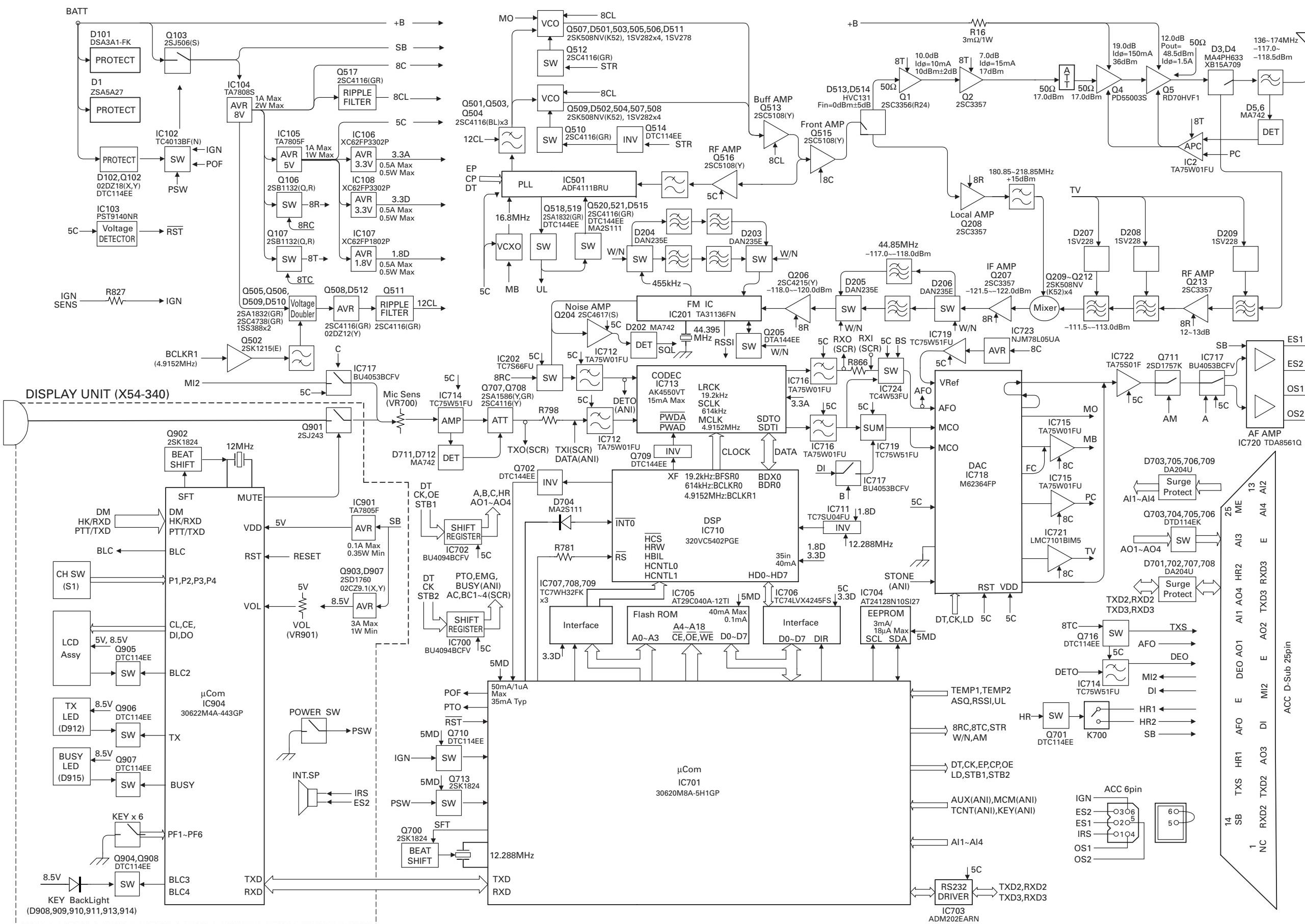


Note : Components marked with a dot (•) are parts of layer

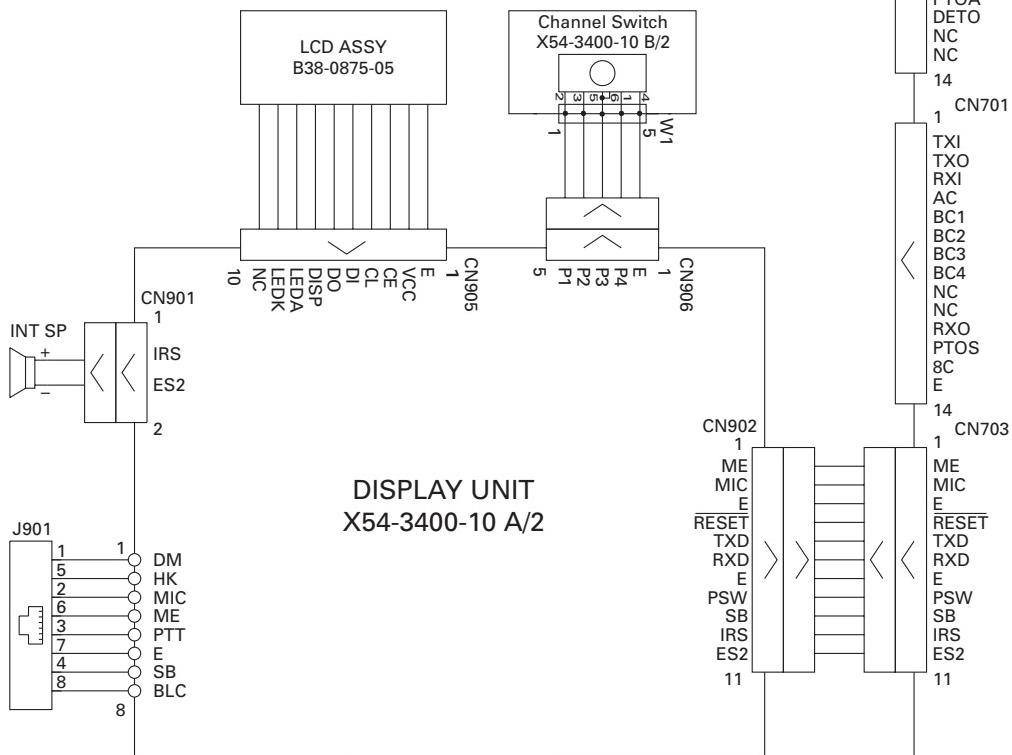
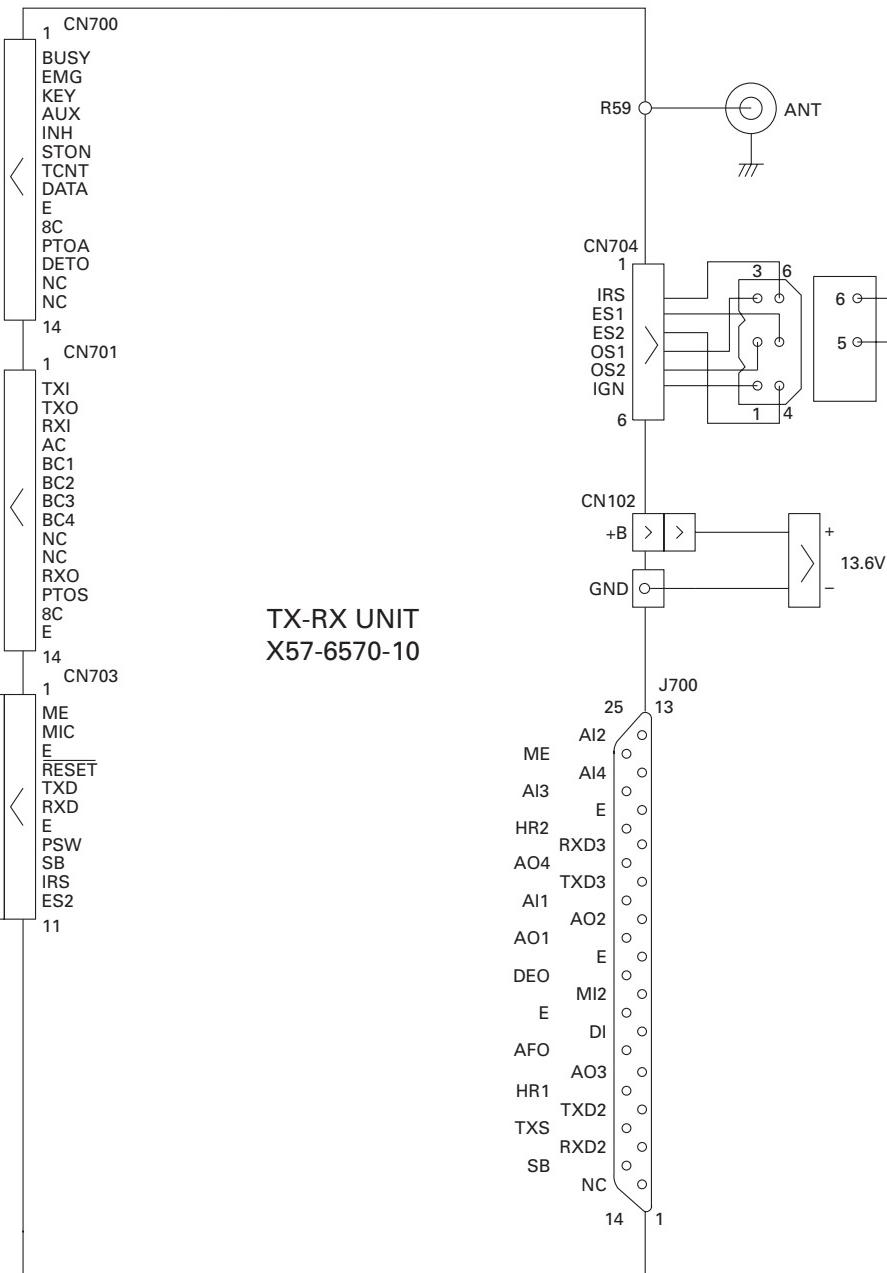
D1	:ZSA5A27	
D2	:02DZ6.2(Y)	
D3	:MA4PH633	
D4	:XB15A709	
D5,6,202,711,712	:MA742	
D7	:1SS226	
D11,104-106,201,700	:1SS355	
D101	:DSA3A1-FK	
D102,710,715	:02DZ18(X,Y)	
D103	:02DZ15(X,Y)	
D108,701-703,705-709	:DA204U	
D109	:02DZ10(Z)	
D203-206	:DAN235E	
D207-209	:1SV228	
D501-508	:1SV282	
D509,510,714,794	:1SS388	
D511	:1SV278	
D512	:02DZ12(Y)	
D513,514	:HVC131	
D515,704	:MA2S111	
D785-790	:02DZ5.1(Y)	
D791	:MINISMDM075/24	
D793	:MINISMDM110/16	
 		2
Q1	:2SC3356(R24)	
Q2,207,208,213	:2SC3357	
Q4	:PD55003S	
Q5	:RD70HVF1-01	
Q101,102,104,105, 202,203,514, 701,710,716	:DTC114EE	
Q103	:2SJ506(S)	
Q106,107	:2SB1132(Q,R)	
Q108,111,201	:DTA114EE	
Q109,112	:DTA114YE	
Q110	:DTC114TE	
Q113,719,720	:DTC114YE	
Q204	:2SC4617(S)	
Q205	:DTA144EE	
Q206	:2SC4215(Y)	
Q209-212,507,509	:2SK508NV(K52)	
Q501,503,504	:2SC4116(BL)	
Q502	:2SK1215(E)	
Q505	:2SC4738(GR)	
Q506,518	:2SA1832(GR)	
Q508,510-512,517,520	:2SC4116(GR)	
Q513,515,516	:2SC5108(Y)	
Q519,521,702,709,714	:DTC144EE	
Q700,713	:2SK1824	
Q703-706	:DTD114EK	
Q707	:2SC4116(Y)	
Q708	:2SA1586(Y,GR)	
Q711	:2SD1757K	
Q712	:2SJ243	
 		4
		
		
		
IC1,2,712,715,716	:TA75W01FU	
IC101,103,725	:PST9140NR	
IC102	:TC4013BF(N)	
IC104	:TA7808S	
IC105	:TA7805F	
IC106,108	:XC62FP3302P	
IC107	:XC62FP1802P	
IC201	:TA31136FN	
IC202	:TC7S66FU	
IC501	:ADF4111BRU	
IC700,702	:BU4094BCFV	
IC701	:30620M8A-5H1GP	
IC703	:ADM202EARN	
IC704	:AT24128N10S127	
IC705	:AT29C040A-12TI	
IC706	:TC74LVX4245FS	
IC707-709	:TC7WH32FK	
IC710	:320VC5402PGE	
IC711	:TC7SU04FU	
IC713	:AK4550VT	
IC714,719	:TC75W51FU	
IC717	:BU4053BCFV	
IC718	:M62364FP	
IC720	:TDA8561Q	
IC721	:LMC7101BIM5	
IC722	:TA75S01F	
IC723	:NJM78L05UA	
IC724	:TC4W53EU	
 		5

TK-7150 TK-7150

BLOCK DIAGRAM



WIRING

TX-RX UNIT
X57-6570-10

TERMINAL FUNCTION

1. Display Unit (X54-3400-10) (A/2)

Pin No.	Name	Description
CN901 (To remote speaker)		
1	IRS	BTL output for remote speaker output.
2	ES2	BTL output for remote speaker output.
CN902 (To TX-RX unit)		
1	ME	MIC ground.
2	MIC	MIC signal output.
3	E	Ground.
4	RESET	Reset signal input.
5	TXD	Serial data input.
6	RXD	Serial data output.
7	E	Ground.
8	PSW	Power switch control signal output.
9	SB	Power input after power switch (13.6V±15%).
10	IRS	BTL input for remote speaker output.
11	ES2	BTL input for remote speaker output.

CN905 (To LCD assy)

1	E	Ground.
2	VCC	5V.
3	CE	Enable output for LCD driver.
4	CL	Clock output for LCD driver.
5	DI	Data output for LCD driver.
6	DO	Not used.
7	DISP	Display control signal output. "L" : Display off
8	LEDA	Power output for LCD backlight.
9	LEDK	Ground for LCD backlight. "L" : Backlight on
10	NC	Non connection.

CN906 (To Display unit B/2 : CH SW)

1	E	Ground.
2	P4	SW position signal input 4.
3	P3	SW position signal input 3.
4	P2	SW position signal input 2.
5	P1	SW position signal input 1.

J901 (MIC jack)

1	DM	Serial data input for keypad MIC.
2	MIC	MIC signal input.
3	PTT	PTT signal input. "L" : TX, "OPEN" : RX Serial data output.
4	SB	Power output after power switch (13.6V±15%).

Pin No.	Name	Description
5	HK	Hook signal input. "L" : On hook, "H" : Off hook Serial data input.
6	ME	MIC ground.
7	E	Ground.
8	BLC	MIC backlight control signal output. "H" : On, "L" : Off

2. Display Unit (X54-3400-10) (B/2)

Pin No.	Name	Description
W1 (To Display unit A/2)		
1	P1	SW position signal output 1.
2	P2	SW position signal output 2.
3	P3	SW position signal output 3.
4	P4	SW position signal output 4.
5	E	Ground.

3. TX-RX Unit (X57-6570-10)

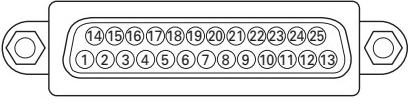
Pin No.	Name	Description
CN700 (To ANI board)		
1	BUSY	TX sens signal output Conventional "H" : Not TX, "L" : TX LTR "H" : Not Link complete, "L" : Link complete
2	EMG	Emergency signal output. "L" : Emergency function is operated, "H" : Emergency function is not operated $L \leq 0.05V, H \geq 4.6V/30k\Omega$ load
3	KEY	TX control signal input. Active low with $47k\Omega$ pull-up to 5V $L \leq 0.8V, H \geq 2.5V$
4	AUX	Emergency signal input. Active low with $47k\Omega$ pull-up to 5V $L \leq 0.8V, H \geq 2.5V$
5	INH	MIC mute signal input. "L" : Mute Active low with $47k\Omega$ pull-up to 5V $L \leq 0.8V, H \geq 2.5V$
6	STON	Side tone input.
7	TCNT	Speaker mute signal input. "L" : Unmute $L \leq 0.8V, H \geq 2.5V$
8	DATA	Data signal input.
9	E	Ground.
10	8C	8V. (CN700 No.10 + CN701 No.13 = 100mA Max.)

TERMINAL FUNCTION

Pin No.	Name	Description
11	PTOA	PTT signal output. "L" : PTT on, "H" : PTT off $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
12	DETO	Detected signal output. DC coupled. $Z_o \leq 100\Omega$ Wide : $0.8V_{p-p}$ typ., Narrow : $0.7V_{p-p}$ typ. (Standard modulation)
13	NC	Non connection.
14	NC	Non connection.
CN701 (To voice scrambler)		
1	TXI	MIC signal input (Capacitor-coupled). $Z_{in} = 100k\Omega$
2	TXO	MIC signal output (Capacitor-coupled). $Z_o = 1k\Omega$ Wide : $85mV_{p-p}$ typ., Narrow : $85mV_{p-p}$ typ. (Standard modulation)
3	RXI	Audio signal input (Capacitor-coupled). $Z_{in} = 27k\Omega$ Wide : $1.3V_{p-p}$ typ., Narrow : $1.1V_{p-p}$ typ. (Standard modulation)
4	AC	Scrambler control signal output. "L" : On, "H" : Off $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
5	BC1	Scrambler code signal output 1. $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
6	BC2	Scrambler code signal output 2. $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
7	BC3	Scrambler code signal output 3. $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
8	BC4	Scrambler code signal output 4. $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
9	NC	Non connection.
10	NC	Non connection.
11	RXO	Audio signal output. DC coupled. $Z_o \leq 100\Omega$ Wide : $1.3V_{p-p}$ typ., Narrow : $1.1V_{p-p}$ typ. (Standard modulation)
12	PTOS	TX signal output. "L" : TX, "H" : Not TX $L \leq 0.05V$, $H \geq 4.6V/30k\Omega$ load
13	8C	8V. (CN700 No.10 + CN701 No.13 = 100mA Max.)
14	E	Ground.
CN703 (To Display unit A/2)		
1	ME	MIC ground.
2	MIC	MIC signal input.
3	E	Ground.
4	<u>RESET</u>	Reset signal output.
5	TXD	Serial data output.

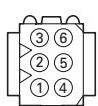
Pin No.	Name	Description
6	RXD	Serial data input.
7	E	Ground.
8	PSW	Power switch control signal input.
9	SB	Power output after power switch ($13.6V \pm 15\%$).
10	IRS	BTL output for remote speaker output.
11	ES2	BTL output for remote speaker output.
CN704 (To ACC 6-pin connector)		
1	IRS	Remote speaker switch.
2	ES1	BTL output for external speaker A.
3	ES2	BTL output for external speaker A.
4	OS1	BTL output for external speaker B (PA).
5	OS2	BTL output for external speaker B (PA).
6	IGN	Ignition sense input.
J700 (ACC 25-pin)		
1	NC	Non connection.
2	RXD2 *	Serial data input 2. RS-232C level. Input voltage range = $\pm 30V$ max. $L \leq 0.4V$, $H \geq 2.4V$. $Z_i \geq 5k\Omega$
3	TXD2 *	Serial data output 2. RS-232C level. $L \leq -5V$, $H \geq 5V/3k\Omega$ load. $Z_o \leq 2k\Omega$
4	AO3	Auxiliary output 3 (Programmable). Active low open collector (100mA max.) (Default none). $L \leq 0.3V$, $H \geq 4.8V$
5	DI	Data signal input (Capacitor-coupled). $Z \geq 10k\Omega$
6	MI2	External MIC input (Capacitor-coupled). $Z = 600\Omega$
7	E	Ground.
8	AO2	Auxiliary output 2 (Programmable). Active low with $10k\Omega$ pull-up to 5V (100mA max.) (Default none). $L \leq 0.3V$, $H \geq 4.8V$
9	TXD3 **	Serial data output 3. $L \leq 0.7V$, $H \geq 4.2V/25k\Omega$ load. $Z_o \leq 1k\Omega$
10	RXD3 **	Serial data input 3. Input voltage range = $+5/0$ max. $L \leq 0.8V$, $H \geq 4.2V$.
11	E	Ground.
12	AI4	Auxiliary input 4 (Programmable). Active low with $47k\Omega$ pull-up to 5V (Default none). $L \leq 0.8V$, $H \geq 2.5V$
13	AI2	Auxiliary input 2 (Programmable). Active low with $47k\Omega$ pull-up to 5V (Default none). $L \leq 0.8V$, $H \geq 2.5V$

TERMINAL FUNCTION / OPTIONS

Pin No.	Name	Description
14	SB	Power output after power switch. $13.6V \pm 15\%$, 1.1A max. at $25^{\circ}C$, 0.8A max. at $60^{\circ}C$
15	TXS	TX sense signal output. Active high with $10k\Omega$ pull-up to 5V. $L \leq 0.3V$, $H \geq 4.8V$
16	HR1	Horn alert signal output 1. 1A max.
17	AFO	Filtered audio output (DC coupled). $Z_o \leq 1k\Omega$
		PA : MIC signal output. 0.65Vp-p typ. (1kHz/5mV input)
		RX : RX low level output. Wide : 1.3Vp-p typ., Narrow : 1.1Vp-p typ. (Standard modulation)
18	E	Ground.
19	DEO	Detected signal output (Capacitor-coupled).
20	AO1	Auxiliary output 1 (Programmable). Active low with $10k\Omega$ pull-up to 5V (100mA max.) (Default none). $L \leq 0.3V$, $H \geq 4.8V$
21	AI1	Auxiliary input 1 (Programmable). Active low with $47k\Omega$ pull-up to 5V (Default none). $L \leq 0.8V$, $H \geq 2.5V$
22	AO4	Auxiliary output 4 (Programmable). Active low open collector (100mA max.) (Default none). $L \leq 0.3V$
23	HR2	Horn alert signal output 2. 1A max. (Default ground)
24	AI3	Auxiliary input 3 (Programmable). Active low with $47k\Omega$ pull-up to 5V (Default none). $L \leq 0.8V$, $H \geq 2.5V$
25	ME	MIC ground. 

* and ** : Pair

4. ACC 6-pin Connector

Pin No.	Name	Description
1	IGN	Ignition sense input.
2	OS2	BTL output for external speaker B (PA).
3	OS1	BTL output for external speaker B (PA).
4	ES2	BTL output for external speaker A.
5	ES1	BTL output for external speaker A.
6	RS1	Remote speaker switch. 

1. KES-5 (External Speaker)

1-1. External View



1-2. Parts List

* : New parts

Ref. No.	New parts	Parts No.	Description
	*	A62-1050-08	Panel assy
	*	A82-0050-08	Rear panel
	*	B43-1142-08	Badge Panel
	*	E30-3479-08	Speaker cable
	*	G13-1923-08	Cushion SP front
	*	G53-1553-08	Packing Rear panel
	*	J29-0699-08	Bracket
	*	N08-0551-08	Dressed screw Bracket
	*	N99-2031-08	Screw set Acc
	*	T07-0741-08	Speaker

2. KRK-9 (Single Control Head Remote Kit)

1-1. External View



1-2. Parts List

* : New parts

Ref. No.	New parts	Parts No.	Description
	*	A62-1039-02	Panel Body
	*	A82-0049-02	Rear panel Head
	*	E37-1008-05	Lead wire with connector 11P
	*	F07-1865-03	Mold cover For cable
	*	G02-0895-04	Earth spring Cable GND
	*	G53-1552-03	Packing Rear panel
	*	J21-8447-04	Hardware fixture Panel
	*	J29-0698-03	Bracket Acc
	*	N08-0550-04	Dressed screw Acc
	*	N87-3008-45	Brazier head taptite screw Panel
	*	N99-2032-05	Screw set Acc

SPECIFICATIONS

GENERAL

Frequency Range	136~174MHz (K)
Number of Channels (Zone)	Conventional CH : Max.128 (1 zone x 128ch~128 zones x 1ch) Trunking ID : Max. 250/zone (max. 32 zones)
Channel Spacing	Wide : 25kHz, 30kHz Narrow : 12.5kHz, 15kHz
Operating Voltage	13.6V DC±15%
Current Drain	Standby : 0.5A Receive : 2.3A Transmit : Less than 12A
Duty Cycle	Transmit : 20%
Operating Temperature range	-22°F~+140°F (-30°C~+60°C)
Frequency Stability (-22°F~+140°F)	±0.00025%
Antenna Impedance	50Ω
Dimensions (W x H x D)	7-1/12" x 2" x 7" (180mm x 50mm x 170mm)
Weight (net)	5.9 lbs (2.7kg)
Band Spread	38MHz

RECEIVER

Sensitivity	12dB SINAD : 0.35µV	20dB Quieting : 0.45µV
Selectivity	Wide : 84dB (±30kHz)	Narrow : 76dB (±15kHz), 76dB (±12.5kHz)
Intermodulation	Wide : 77dB (±30, 60kHz)	Narrow : 75dB (±15, 30kHz)
Spurious Response	85dB	
External Audio Output	12W (@4Ω 3% distortion), 13W (@4Ω 5% distortion)	
Internal Audio Output	3.2W (@16Ω 3% distortion), 3.5W (@16Ω 5% distortion)	

TRANSMITTER

RF Output Power	50 to 15 watts	High : 50 watts	Low : 15 watts
Type of Emission	Wide : 16K0F3E, 20K0F1D	Narrow : 11K0F3E, 11K2F1D	
Spurious Response	75dB		
FM Hum & Noise	Wide : 48dB	Narrow : 42dB	
Microphone Impedance	600Ω		
Audio Distortion	Less than 1% at 1000Hz		

Kenwood follows a policy of continuous advancement in development.

For this reason specifications may be changed without notice.

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Applicable MIL-STD

Standard	MIL 810C Methods/Procedures	MIL 810D Methods/Procedures	MIL 810E Methods/Procedures	MIL 810F Methods/Procedures
Low Pressure	500.1/Procedure I	500.2/Procedure I, II	500.3/Procedure I, II	500.4/Procedure I, II
High Temperature	501.1/Procedure I, II	501.2/Procedure I, II Cat. A1	501.3/Procedure I, II Cat. A1	501.4/Procedure I, II
Low Temperature	502.1/Procedure I	502.2/Procedure I, II Cat. C1	502.3/Procedure I, II Cat. C1	502.4/Procedure I, II
Temperature Shock	503.1/Procedure I	503.2/Procedure I Cat. A1,C1	503.3/Procedure I Cat. A1,C1	503.4/Procedure I, II
Solar Radiation	505.1/Procedure I	505.2/Procedure I	505.3/Procedure I	505.4/Procedure I
Rain	506.1/Procedure II	506.2/Procedure II	506.3/Procedure II	506.4/Procedure III
Humidity	507.1/Procedure II	507.2/Procedure II	507.3/Procedure II	507.4
Salt Fog	509.1/Procedure I	509.2/Procedure I	509.3/Procedure I	509.4
Dust	510.1/Procedure I	510.2/Procedure I	510.3/Procedure I	510.4/Procedure I, III
Vibration	514.2/Procedure VIII, X	514.3/Procedure I Cat. 8	514.4/Procedure I Cat. 8	514.5/Procedure I Cat. 20
Shock	516.2/Procedure I, II, III, V	516.3/Procedure I, IV, V	516.4/Procedure I, IV, V	516.5/Procedure I, IV, V

KENWOOD CORPORATION

2967-3, Ishikawa-machi, Hachioji-shi, Tokyo 192-8525, Japan

KENWOOD U.S.A. CORPORATION

P.O. BOX 22745, 2201 East Dominguez Street, Long Beach, CA 90801-5745, U.S.A.

KENWOOD ELECTRONICS CANADA INC.

6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

KENWOOD ELECTRONICS DEUTSCHLAND GMBH

Rembrücke Str. 15, 63150 Heusenstamm, Germany

KENWOOD ELECTRONICS BELGIUM N.V.

Leuvensesteenweg 248 J, 1800 Vilvoorde, Belgium

KENWOOD ELECTRONICS FRANCE S.A.

13, Boulevard Ney, 75018 Paris, France

KENWOOD ELECTRONICS U.K. LIMITED

KENWOOD House, Dwight Road, Watford, Herts., WD18 9EB United Kingdom

KENWOOD ELECTRONICS EUROPE B.V.

Amsterdamseweg 37, 1422 AC Uithoorn, The Netherlands

KENWOOD ELECTRONICS ITALIA S.p.A.

Via G. Sirtori, 7/9 20129 Milano, Italy

KENWOOD IBERICA S.A.

Bolivia, 239-08020 Barcelona, Spain

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.

(A.C.N. 001 499 074)

16 Giffnock Avenue, Centrecourt Estate, North Ryde, N.S.W. 2113 Australia

KENWOOD ELECTRONICS (HONG KONG) LTD.

Unit 3712-3724, Level 37, Tower one Metroplaza, 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong

KENWOOD ELECTRONICS TECHNOLOGIES(S) PTE LTD.

Sales Marketing Division

1 Ang Mo Kio Street 63, Singapore 569110

